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THE RELATIONSHIP BETWEEN TEACHERS' PLANNED
AND ACTUAL TIME ALLOCATIONS: A DESCRIPTION AND MODEL

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Robert Hill

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THE RELATIONSHIP BETWEEN TEACHERS' PLANNED
AND ACTUAL TIME ALLOCATIONS: A DESCRIPTION AND MODEL

By

Robert Hill

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ABSTRACT

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PLANNED AND ACTUAL TIME ALLOCATIONS:
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Robert Hill

The purpose of this study was to investigate teachers' planned and actual time allocations and describe the relationship between them.

The study addressed four major questions:

(1) What is the general pattern of teachers' planned time allocations?

(2) What is the general pattern of teachers' actual time allocations?

(3) How do teachers' planned and actual time allocations compare?

(4) What linear model describes the relationship (teacher time decision pattern) between a teacher's planned and actual time allocations?

These questions were investigated in the classrooms of 6 different elementary teachers.

Each participating teacher was observed at least eight full days over a period of twelve consecutive weeks. Teachers' daily written lesson plans which corresponded to the observed days were also

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Each participating teacher was observed at least eight full days over a period of twelve consecutive weeks. Teachers' daily written lesson plans which corresponded to the observed days were also

collected.

Three statistical techniques were employed in the analyses of planned and actual time allocations: (1) measures of central tendency; (2) measures of variability; and (3) Pearson correlation. Planned time allocation was the independent variable and actual time allocation was the dependent variable.

By using the simple linear regression model, we specified fifteen theoretical models that could possibly represent relationships between the two variables under study. It was determined that nine models could not represent time decision patterns of practicing teachers. Six of the theoretical models, however, were shown to represent time decision patterns of practicing teachers. Of the six, we concluded that model 6 could account for all the available school time while at the same time summarizing not only the type of decision pattern teachers are thought to follow (linear) but also the different ways teachers are likely to modify their planned time allocations each day.

Results of statistical analyses showed that teachers make planned time allocation of about eighty-three percent of the available school time (AST); nearly one-half (47.9%) of AST was allocated to activities in the academic content areas and more than one-third (35.3%) was allocated to activities in the nonacademic content areas.

In general, teachers' actual time allocations were found to be very similar to their planned time allocations. But, four ways in which teachers departed from their plans were identified.

Pearson correlation on the combined sample data revealed a moderately high positive correlation of .67 between planned and actual time allocations.

Regression analyses showed that the relationship between teachers' planned and actual time allocations was positive and could best be described by theoretical model 6.

The principal finding from this study was that planned time allocations were causally related to actual time allocations (opportunity). Thus, it was concluded that planned time allocations were also related to achievement since time provided or opportunity and achievement are causally related. This linkage between planned time allocations and achievement provides strong support for the notion that teacher planning in an essential teacher practice.

I have completed my doctoral program.

It is with great satisfaction that I now dedicate this dissertation

To my loving wife, Joy

and to my three wonderful

children,

Lisa

Mark

Linda.

May the love of God rest upon them.

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Proverbs 2:6 says, "For the Lord gives wisdom, and from his mouth come knowledge and understanding." During the course of my work, there have been a number of difficult situations, but through each of them God has been a source of strength and wisdom.

"Great is our Lord and mighty in power; His understanding has no limit" (Psalm 174:5). Though my understanding is finite, my comfort has come through trusting in His infinite understanding. He prompted me to set and achieve the goal of attaining a doctoral degree. I cannot know in total what the end result of that accomplishment shall be, but He does know and understand. That gives purpose and direction to my life, for which I thank Him.

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CHAPTER I

INTRODUCTION

Planning for instruction is an important professional activity of elementary teachers. It is the beginning step in instruction (Smith, 1977) and a major part of an elementary teacher's job. In discussing the economic environment of the classroom, Duffy asserts that, "What the teacher decides to do in allocating (which includes planning) among the various students, those resources made available by the institution is the heart of the teaching act" (Duffy, 1978). Planning provides a sense of direction and order in the classroom.

According to Yinger, "It may be a rare teacher and classroom that would be able to function effectively without some kind of planning by the teacher" (Yinger, 1977).

The value teachers have for planning may be indicated by the effort they put into it. Clark and Yinger report that elementary teachers they studied spent, on the average, twelve hours per week in planning. Much of the planning was on their own time (Clark and Yinger, 1980).

Among other things, planning involves the allocation of time to various activities. The activities are associated with specific content areas, e.g., Reading. Allocated time then is simply the amount of time a teacher intends to provide for learning content.

Allocation of time as reflected in teachers' written plans is normally made for a day or week, but can be made for longer time frames (Clark and Yinger, 1980).

It appears that teachers establish a general time allocation pattern early in the school year; with only minor variations, the pattern is likely to remain intact for the whole year (Smith, 1977; Clark and Elmore, 1979).

Time appears to be causally related to achievement. One major finding of the Beginning Teacher Evaluation Study (BTES) was that

> The amount of time that teachers allocated to instruction in a particular curriculum content area is positively associated with student learning in that content area. (Fisher, Berliner, et al p. 7, 1980)

A review of the literature by Rosenshine on content covered or opportunity to learn revealed a similar relationship. In all but one of the studies he reviewed, a significant relationship between content covered and student achievement gain was reported (Rosenshine).

The work of Wiley and Harnischfeger also underscores the important role time plays in student achievement. Based on their analyses of the Equality of Educational Opportunity Survey (EEOS) data from the Detroit Public Schools, they concluded that "...the amount (or opportunity) of schooling a child receives is a highly relevant factor for his achievement." (Wiley and Harnischfeger, p. 9, 1974). Further study and analysis of the time and achievement relationship led them to conclude that "...the total amount of active learning time (spent) on a particular instructional topic is the most important determinant of the pupil's achievement on that topic." (Harnishfeger and Wiley, 1976).

It is generally understood that a student's total active learning time is a function of both teacher and student behaviors. Carroll argued that teacher behavior most responsible for determining a student's total active learning time is that of providing opportunity or time for learning while the most important behavior on the part of the student is to persevere or spend time on learning (Carroll, 1963).

Teachers exercise almost complete control over allocation of time in the classroom (Smith 1977; Corno 1979); thus, opportunity is affected by classroom decisions teachers make regarding use of time. On the other hand, perseverance is affected by such factors as the student's readiness to learn, his/her motivation and attention span. Perseverance cannot operate, however, unless opportunity for learning has first been provided. Thus, perseverance is a function of opportunity; and, since opportunity is a function of teacher classroom decisions, perseverance is also a function of teacher classroom time decisions. Teacher classroom decisions then are most important in the determination of a student's total active learning time. For this reason, we view "teacher classroom time decision behavior" as an important area of teacher practice to study.

What factor(s) influence teacher classroom decisions regarding use of time? The findings from several teacher planning studies suggest that instructional plans are an important influence on teachers' classroom decisions. (Smith and Sendelbach, 1979; Peterson and Clark, 1978); Morine and Valance, 1975; Morine-Dershimer, 1979; Zahorik, 1970; and Clark and Yinger, 1979). In a discussion of this relationship, Harnischfeger and Wiley have suggested that a high correlation likely exists between a teacher's plan and what actually occurs in the classroom. (Harnischfeger and Wiley, 1976).

Problem

Often, time allocations are a part of teacher plans. It is reasonable to assume then that teachers' planned time allocations exert a major influence on their actual time allocations.

The assumed relationship between planned and actual time allocations cannot be supported by empirical evidence, however. None of the studies cited above specifically addresses the issue of the relationship between planned and actual time allocations. It is an area of the teaching/learning process which has received little attention from researchers. Therefore, very little is known about the way in which a teacher's planned and actual time allocations are related and whether or not a teacher's planned time allocations affect opportunity for learning.

It is the purpose of this study, therefore, to investigate teachers' planned and actual time allocations and describe the relationship between them.

Importance of Study

Because teachers invest a considerable amount of time and effort in planning, the value of planning is an important issue to consider. If planned time allocations are found to be causally related to actual time allocations (opportunity), then we may conclude that planned time allocations are also related to achievement since opportunity and achievement are causally related. Such a finding would provide a firm basis for arguing that teacher planning is an important teacher practice. It would also serve to encourage educators to make time and resources available to teachers for planning; and, it would give educators a sound rationale for developing programs to strengthen teacher planning skills.

Clark and Yinger have expressed a need for such a study because it "is perhaps the most promising point of contact between research on teacher thinking and teaching effectiveness" (Clark and Yinger, 1977). Also, Harnischfeger and Wiley believe that a study "of the conformity of actual teaching to its plan would greatly augment our understanding of the kinds of discrepancies that occur and help us portray teachers in ways that relate to these discrepancies" (Harnischfeger and Wiley, 1976).

Finally, results of this study may cause teachers to evalute their own planning and implementation practices. Such an evaluation may facilitate growth in their planning and implementation skills.

Procedure for the Study

Observational data collected by the Language Arts Project of the IRT were used in this study. The data were collected during a twelve week period between March 1, 1978 and the first week of June, 1978. Data were collected from seven teachers in elementary schools from suburban areas and small towns around Lansing, Michigan. Four types of classrooms were included in the study: (1) three self-contained second grade classrooms, (2) one second-third grade combination classroom, which is part of a four classroom, multi-age grouping situation team taught within an open classroom, (3) one fifth grade classroom partially self-contained with departmentalization in Mathematics and Reading instruction and (4) two fourth-fifth grade combination classrooms team taught within an open classroom; data were collected from both teachers.

Each teacher's weekly planning schedules for the entire twelve week period were collected. Seven observers recorded the activities of the teachers and their pupils, making full-day observations once a week for nine weeks. Additional background information about the teachers, their classrooms and their pupils was collected through interviews and questionnaires.

Observational data and teacher weekly plan data were coded for each teacher. The coding included the beginning and ending times of each activity and its content. All content was coded according to global designations such as Reading, Science, Mathematics, etc. Four instruments were used: an observation instrument, a questionnaire, an interview and a weekly time and content allocation schedule which was in the form of the teacher's plan book.

Overview of the Study

Chapter II consists of a review of the pertinent literature on content covered and academic engaged time, planning and teacher instructional decision making. In Chapter III, the design of the study is discussed. The teacher sample, data collection instruments and methods are specified in this chapter. The chapter ends with a discussion of the procedure for analysis. In Chapter IV, theoretical models describing possible linear relationships between a teacher's planned and actual time allocations are explored. Chapter V consists of a description of teachers' planned and actual time allocations. In Chapter VI, regression models are compared with theoretical models. And in Chapter VII, the findings and conclusions are summarized, educational implications discussed and possible directions for future research are presented.

CHAPTER II

LITERATURE REVIEW

Introduction

Research on instructional planning is a fairly recent development. Thus far, the number of completed studies is small. Prior to 1970, when the first empirical study of instructional planning was undertaken by Zahorik, the literature dealt primarily with untested ideas on instructional planning. A basic assumption underlying much of the early literature was that Tyler's (1950) model of curriculum planning best described teacher planning practices; it was natural then that early research on planning investigated the role this model played in planning. As evidence began to accumulate, the weakness of the Tyler model became apparent. Interest then shifted to investigation of the decision-making processes involved in planning.

Recently, interest has focused on questions dealing with the relationship between plan and classroom practices (Harnischfeger and Wiley, 1976; Clark and Yinger, 1979). The focus of this research is also on this relationship.

In this chapter, studies on instructional planning will be reviewed. The review is limited to those studies which specifically deal with at least one of the following topics: teacher planning practices; interactive teacher decisions and their relation to instructional planning; influence of planning on instruction; and planning models. Some of the recent literature on the effect of time on achievement will also be reviewed as it has implications for planning and classroom practice.

Teacher Planning Practices

Teacher Reports of Planning Practices

The first general survey of teacher planning practices was conducted by Smith (1977). He distributed a questionnaire to 330 elementary teachers of two different school districts. One was a small suburban district and the other a large urban district. Eighty-seven teachers responded.

Smith sought to answer three questions: What is the content of teacher planning? How do teacher plans evolve? and, What contributes to plan evolution and content? He anticipated using the answer to these questions to help him refine his previously developed model of how teachers plan.

Results of his survey are summarized as follows:

a. Teachers organized their planning on a weekly basis. In the urban district, 92% of the teachers who responded said they organized on a daily or weekly basis (with only a few indicating daily schedules); in the suburban district, 86% of the respondents indicated they organized on a daily or weekly basis.

b. Over 80% of the teachers indicated they planned one or two weeks in advance. The mean response for urban teachers was 1.53 weeks and for the suburban teachers, it was 1.27 weeks.

c. The primary influence on teachers in making time allocations was the teachers' estimation of the importance of the subject, either in general or to the class being taught in particular.

d. Over 93% of the suburban and 91% of the urban teachers used small groups for Reading instruction. In Mathematics instruction, 84% of the suburban and 86% of the urban teachers used small groups. Teachers in both districts changed both the number and the composition of the groups from time to time. Formation of the groups in both districts was based on teacher impressions of pupil ability and results of teacher made tests as well as the prior achievement of pupils.

e. One quarter of the teachers used self-constructed materials more than half of the time in Reading. Over 42% used self-constructed materials over half of the time in Mathematics.

f. Published instructional series influenced planning decisions.

g. The largest amount of time per week was spent in Reading (averaging 5 hours, 47 minutes) followed by Math (3 hours, 33 minutes), English (2 hours, 14 minutes), Social Studies (2 hours, 10 minutes) and Science (1 hour, 49 minutes).

Further insight into teacher planning practices has been provided by Clark and Yinger (1979). They distributed a planning survey to approximately 300 teachers, 78 of which were returned. Teachers were asked to describe the various kinds of planning they engage in, detail the considerations and constraints which influenced their planning, give reasons why they made plans which varied in length from a day to a year; and explain how their plans differed for different subject matters. Teachers were also asked to provide examples representing the three most important types of planning they did during the year.

Clark and Yinger summarized the results of their survey as follows:

a. Learning objectives were seldom the starting point for planning. Instead teachers planned around their students and around activities.

b. Teachers tended to limit their search for ideas to resources that were immediately available such as teacher editions of textbooks, magazine articles, films and suggestions from other teachers.

c. Teachers indicated that most of their planning was done for Reading and Language Arts (averaging 5 hours per week) followed by Math (2.25 hours per week), Social Studies (1.7 hours per week) and Science (1.4 hours per week).

d. Teacher planning was more explicit and involved a longer lead time in team teaching situations than in self-contained classrooms.

e. The most common form of written plans was an outline or list of topics to be covered although many teachers reported that the majority of planning was done mentally and never committed to paper (Clark and Yinger, 1979, p. 15).

Several studies which showed that classroom organization, rules, procedures and routines are established during the first weeks of September (Tikunoff and Ward, 1978; Buckley and Cooper, 1978; Anderson and Evertson, 1978; and Shultz and Florio, 1979) led Clark and Elmore (1979) to hypothesize that planning during September might differ from planning during the remainder of the school year. They investigated this question by separately interviewing five elementary school teachers in early October. During the interview, each teacher was asked to recall and describe his/her planning for each week of the school year beginning with the week before students arrived.

The interviews revealed that planning during the first weeks of school was indeed different, and could be divided into three distinct phases. In each phase, a specific problem of planning was addressed. During phase one ("Get Ready" phase), teachers were occupied with the problem of organizing the classroom setting. Their planning goal was to have the first days of school be "smooth and enjoyable for both student and teacher". Planning decisions were in response to the teacher's need to arrange the physical environment, gather information on students and organize academic materials.

The next phase ("Get Set" phase) lasted for two or three weeks in September. In this phase, teacher planning concerns shifted from problems associated with space and materials to problems associated with the student. Planning decisions during this phase dealt primarily with problems of testing student capabilities in order to determine student placement in subgroups, especially for Reading and Mathematics.

The focus of other planning decisions during this phase concerned the establishment of a workable social system in the classroom.

The teacher's primary concerns during the third phase ("Go" phase) was the establishment of a routine daily and weekly time schedule. Generally, this goal was accomplished by the beginning of October. Teachers reported that planning for the remainder of the school year could then proceed within the structure provided by these daily and weekly time routines.

The process of schedule routinization was also reported by Smith (1977). He noted that

> "...once the teacher has determined a weekly subject schedule, s(he) can simply repeat this scheduling in a cyclical fashion. The schedule is likely to remain intact for the school year ..." (Smith, 1977, p. 21).

The fact that the teachers in the Clark and Elmore study

> "...were already planning their school year at least a week before their students arrived...illustrate(s) the extent to which teachers are concerned with planning." (Clark and Elmore, 1979, p. 14).

Findings on the amount of time teachers spend planning (Clark and Yinger, 1979) support this conclusion.

The characteristic of teachers to establish subject schedules early in the school year indicates that they intend to regularly provide time for activities in the different content areas.

The existence of these schedules raises several questions. First, are planning time allocations (schedules) similar or do they differ significantly? Smith (1977) suggested that there are important differences. We will attempt to replicate his findings. Second, to what extent are teachers' planning time allocations associated with their actual time allocations? Harnischfeger and Wiley contend there is a very close correspondence between a teacher's planned time allocations and what actually occurs in the classroom (Harnischfeger and Wiley, 1976, p. 19). Findings from a study by Schmidt, et al raises a question about the validity of this assumption. Roehler and Schmidt found that actual time allocation for various subject matters differed considerably from teacher to teacher (Roehler and Schmidt, 1979). The question is, to what extent were these differences due to differences in their planned time allocations and to what extent were differences due to differences in how closely teachers followed similar planned time allocations.

One goal of the present study was to investigate this question in order to increase our understanding of teacher planned time allocations and how they relate to actual time allocations.

Preactive Planning Decisions

The early literature on teacher planning assumed teacher planning decisions closely followed the Tyler (1950) planning model. Basically, the model recommends four steps thought essential for effective planning: (1) specify objectives, (2) select learning activities, (3) organize learning activities, (4) specify evaluation procedures. Zahorik describes the model in this way:

> "It is a rational, logical model in which ends or objectives take precedence over and are separated from means or activities. Given the long time availability of this model the number of curriculum experts who support it, and its powerful appeal to rationality, it is reasonable to believe that the model is in widespread use at all levels of teaching." (Zahorik, 1975, p. 134).

Several studies have been undertaken to determine the extent to which teachers preactive planning decisions follow the Tyler model. The first, conducted by Taylor (1970), investigated decisions teachers made when planning syllabi for courses. He administered a questionnaire to 261 teachers of English, Science and Geography, conducted group discussions with them and analyzed course syllabi.

Taylor found that curricular planning decisions first of all focused on factors associated with the teaching context and then in order of importance to the teacher on pupil interests, aims and purposes of teaching, and finally on evaluation considerations. Contrary to the Tyler model, aims and purposes or objectives were considered only after factors associated with the teaching context, i.e., resources, content, time and the pupil were dealt with. Of only minor importance to the teacher was consideration of evaluation needs. Taylor's study suggests that when planning course syllabi, teachers do not follow Tyler's rational model of planning. Because Taylor's study was more a study of curriculum planning, his findings are only suggestive of how individual teachers might plan for instruction.

Zahorik (1975) was interested in learning what individual teachers actually did as they prepared to teach. More specifically, he was interested in their planning decisions, use of objectives and attention to activities.

A volunteer sample of 194 teachers was asked to list in writing the decisions they made prior to teaching and the order in which they usually made them; then, teachers who indicated they made decisions about objectives and activities were asked to give one example of each. Zahorik classified their decisions according to the types of decisions made. His classification scheme contained the following categories: objectives, content, activities, materials, diagnosis, evaluation, instruction and organization.

Analysis of the data showed that 81% of the teachers made decisions about activities. Fifty-one percent of the teachers made their first decision about content while only 28% of the teachers made their first decision about behavioral objectives. Zahorik concluded that:

> "Content is one of the most important planning decisions in terms of quantity of use. Almost three-fourths of the teachers make this decision, and it is made first more often than any other decision." (Zahorik, 1975, p. 137.)

and,

> "...the breadth and depth of the content for the teaching-learning session is of primary concern to teachers." (Zahorik, 1975, p. 138.)

Overall, decisions about objectives were not particularly important in terms of quantity of use. Similar findings have been reported by other investigators (Goodlad, et al, 1974; Joyce and Harootunian, 1964; Popham and Baker, 1970; Peterson, Marx and Clark, 1978).

In the Peterson, Marx and Clark study, planning decisions of twelve different teachers in a laboratory setting were examined. Teachers were asked to think aloud while planning to teach three Social Studies lessons; the lessons were to be based on a list of objectives and Social Studies text material provided by the researchers. Each lesson was to be taught for fifty minutes to three different groups of eight students on three different days. At the beginning of the day in which the lesson was to be taught, teachers were given ninety minutes to plan. The number of planning statements (decisions) made by each teacher was obtained from audio recordings of the planning sessions and coded into seventy different categories.

Results showed that teachers paid the most attention to subject matter and instructional process aspects of the lesson. Included in instructional process were student and teacher activities. Teachers were least of all concerned with objectives.

Morine-Dershimer (1977) also investigated teacher planning decisions but in a more natural setting: she provided forty volunteer elementary teachers with special curricular materials and asked them to plan and teach two 20-minute lessons, one in Reading and one in Mathematics. The lessons were to be taught in the teachers' own classrooms to twelve of their own students. Written lesson plans were collected after each lesson and analyzed to determine their specificity, general format, statement of goals, source of goal statement, attention to pupil background and preparation, evaluation procedures and alternative procedures. During analysis, special attention was paid to teacher use of behavioral objectives in their plans.

Morine found that written plans were generally in the form of a fairly specific outline in which little attention was given to behavioral goals, diagnosis of student needs, evaluation of learning, or possible alternative courses of action. The outlines did contain fairly specific information about cognitive aspects of the lesson and sequence (time element) of activities to occur in the classroom. Observation and interview data revealed that the teachers had made some planning decisions about the lesson which were not stated in their written plans.

In an effort to better understand teachers' unstated plans, Morine-Dershimer (1979) interviewed teachers before the school day started. During the interview, teachers were asked to state their plans for the Reading lesson which would be observed later in the day. Their responses to this general question consistently focused on content to be covered and activities to be engaged in. Frequently, they identified materials they would use during the planned lesson. Rarely did teachers mention pupil ability, specific objectives, teaching strategies, or seating arrangements. More specific questions about pupils, materials, objectives strategies, etc. elicited responses which indicated they had mental plans or images of their lesson which included these aspects of instruction.

Smith and Sendelbach (1979) took a slightly different approach when they studied Science planning of elementary teachers: they compared the literal program approach of the Science Curriculum Improvement Study (SCIS) curriculum with the teachers' intended approach developed through planning.

The results they obtained were similar to those reported by Morine-Dershimer: teachers made only sketchy written notes organized by time sequence but had developed detailed mental plans of what they intended to do in teaching the lesson. Overall, decisions involving objectives occurred infrequently; instead, planning decisions were found to relate most often to activities the teachers felt were attractive or appropriate for their students and which incorporated concepts or skills teachers felt were important for their students to learn. This is consistent with Smith's (1977) finding that

> "...the teacher considers herself as the person ultimately responsible for making time allocation decisions and her personal estimation of subject importance as the primary determinant of what that allocation will be." (Smith, 1977, p. 40.)

A finding common to these studies was that teachers' planning decisions rarely involve objectives; instead teachers' planning decisions most often involved content, activities and time schedules.

These studies suggest that planning decisions are retained by the teacher in two different forms: in written plans, and in the teacher's memory (mental plans). Written plans seem to be concerned more with the allocation of time to specific content/activities while plans retained in a teacher's memory seem to be concerned more with instructional strategies, goals, materials, and pupil needs. Both written and mental plans have been shown to have an effect on classroom practice (Zahorik 1970; Clark and Yinger 1979; Smith and Sendelbach 1979). Because written plans are more concerned with allocation of time to different activities, we chose to use this plan form in our study as a means of documenting teachers' planned time allocation decisions.

Interactive Decisions and Their Relation to Teacher Planning

Peterson and Clark (1978) studied teacher interactive decision making as part of the larger study on effective teaching mentioned earlier (Peterson, Marx and Clark, 1978). They explored interactive decision making by replaying for each teacher in the study four brief videotaped segments of his/her teaching of a special Social Studies lesson. During the replay sessions, teachers were asked to recall what they were thinking about while teaching; questions dealt with what they were doing in the segment, what they noticed about the students, whether they were considering alternative actions or strategies at the time and whether anything in the situation caused them to act differently than planned.

Teacher responses showed they rarely considered alternative strategies and if they did, it was only when the lesson was going poorly. But even when instruction was going poorly, teachers rarely considered alternative activities or strategies. As a result, teachers made few decisions that resulted in major changes in their plans. Their interactive decision making was more a process of fine tuning and adapting to unpredictable aspects of the situation such as specific student responses.

Morine and Vallance (1975) used a similar technique to study interactive decisions made by 40 second and fifth grade teachers. Rather than using segments from a taped lesson as in Peterson and Clark, the researchers replayed the entire twenty minute video-taped lesson for each teacher. During the playback session, each teacher was encouraged to stop the tape at any point where (s)he was aware of having made a decision; the interviewer could also stop the tape at any point where a pupil gave an incorrect answer or where there was a transition from one activity to another. Whenever the tape was stopped, the interviewer asked the teacher about what they were thinking, what they were noticing, what decision was made, and what, if any, alternatives they were considering but rejected.

In general, the researchers found that almost all teacher decisions related either to interchanges (instantaneous verbal interaction) or planned activities (preactive planning decisions). As in the Peterson and Clark study, only a very few decisions involved changing to unplanned strategies.

In a related study, Morine-Dershimer (1979) was interested in finding out how interactive decision making by elementary teachers was related to discrepancies between plan and classroom reality. She defined discrepancy in terms of the teacher's perception of how closely the actual classroom instruction approximated his/her expectations about how the lesson would probably proceed. Morine-Dershimer measured the amount of discrepancy by

> "(1) The proportion of decision points at which the teacher expressed surprise at the event under discussion or otherwise indicated that the event did not fit well within the teacher's set of expectations for the lesson; (2) the proportion of decision points at which the teacher reported being disturbed or bothered by the event under discussion." (Morine-Dershimer, 1979, p. 5.)

Data were collected through planning interviews before the school day began and stimulated recall interviews conducted while viewing videotape of the teacher's instruction.

Based on the interview data, Morine-Dershimer classified each lesson according to one of the following three types:

(1) one showing little or no perceived discrepancy;

(2) one showing minor perceived discrepancy;

(3) one showing critical perceived discrepancy.

It was found that teachers processed different information about pupils and exhibited different decision-making behavior. When little or no discrepancy occurred, the teacher processed information more in terms of the plan than of reality. (S)he responded to decision points in two ways: (1) by referring to images of the lesson and pupils (s)he had developed through preactive decision making during planning; and (2) by use of established routines. Virtually no decisions or even considerations of alternatives were noted at this level of discrepancy.

In lessons where minor discrepancy occurred, the teacher processed information derived mainly from pupil behavior exhibited during the lesson; but instead of responding to student behaviors in terms of preformed images or routines, the teacher made "in-flight" decisions. These decisions, though, did not substantially alter the basic plan. Perhaps this was so because teacher observations of pupil behaviors were focused by the plan.

When the teacher perceived a more serious discrepancy, (s)he began to process a wide range of information which related to learning problems of individual pupils. For this situation, the plan did not serve to focus the teacher's observation very sharply; furthermore, the information about student differences did not provide a basis for any decision making, so the teacher postponed decisions until a later date. These unexpected problems proved very disturbing and bothersome to the teacher; as a result, the problems interfered with the efficient progress of the lesson.

Studies on interactive decision making indicate a fairly strong relationship exists between teachers' preactive decisions and subsequent interactive decisions. Preactive decisions appear to circumscribe the area in which later interactive decisions are made.

A weakness of these studies is that teacher decisions were investigated in the context of only a few lessons. Furthermore, the lessons were essentially immune from teacher decisions to cancel them or alter their length since the lessons were either experimenter described or the teacher and researcher agreed the lessons would occur. This design prevented the researchers from learning anything about decisions teachers commonly make about what to teach, whether to delete the lesson from the plan, substitute another lesson or alter the length of the planned lesson. Such decisions can have a profound effect on a students' opportunity to learn. The present study was designed so that decisions like these which affect use of time in the classroom could be investigated in a natural setting over a fairly long period of time, thus minimizing any influence the study might have on teacher decisions about time.

Influence of Planning On Instruction

In the first empirical study of instructional planning, Zahorik (1970) sought to examine the effect of a simple plan, as opposed to no plan, on teacher instructional behavior. He selected twelve fourth grade teachers and divided them into two groups. All six teachers in one group were given the same skeletal plan and encouraged to add to it. The plan contained behavioral objectives and a detailed outline of content each teacher was to teach to his/her own class two weeks in the future. The second group of six teachers was not provided with any lesson plan but was told to reserve an hour of instructional time in order to carry out a task for the researcher. All twelve lessons were audio recorded.

Recorded protocols of the twelve lessons were analyzed to identify "...teacher behavior that is sensitive to students." (Zahorik, 1970, p. 144.) Analysis of the protocols revealed a difference on this dimension of teacher behavior between planners and non-planners. Zahorik characterized teachers who planned as showing less honest or authentic use of the pupils' ideas during the lesson than those who did not plan. He concluded that use of the typical planning model--goals, activities and their organization and evaluation--led the teacher to be insensitive to pupils. He speculated that a possible reason for this was "... planning makes the teachers' thinking rigid and puts him on a track that is nearly derail-proof." (Zahorik, 1970, p. 149.)

Findings from the Peterson and Clark study mentioned earlier support for this speculation. Peterson and Clark correlated interactive decision making scores with planning scores and obtained a positive relationship between planning that emphasized instructional objectives and the tendency to stay with the original plan even when it was not succeeding. On the other hand, teachers who were more concerned with instructional processes in their planning rather than in instructional objectives showed a tendency to change to alternatives if instruction was not proceeding according to plan. In other words, teachers who emphasized instructional objectives in their planning appeared to be more rigid than teachers who emphasized instructional processes.

Clark and Yinger (1979) did a longitudinal study of teacher planning for a unit on writing. In all, five different plans were studied. During the three weeks of plan development, each teacher recorded his/her thinking and planning in a journal. Also, during plan development, teachers were interviewed twice a week and several observations were conducted in their classrooms. Upon completion of the plans, teachers were asked to implement them in their classrooms over a two-week period.

Although each of the plans was unique, each could be categorized as either an "incremental plan" or a "comprehensive plan". An incremental plan was defined as a set of activities to get the unit started followed by a series of changes as a result of classroom experience and teacher reflection on what the next logical step should be.

A comprehensive plan was defined as a well-defined framework for future action: a very detailed long-range plan. The comprehensiveness of the plan gave the teacher a fairly complete picture of what to anticipate in the classroom during instruction.

The instructional behavior of teachers who used an incremental plan was judged to be one of spontaneity. Clark and Yinger theorized this behavior allowed the incremental planner to stay "...in close contact with the needs and status of their students." (Clark and Yinger, 1979, p. 20). But according to the researchers, this type of planning had several disadvantages: first, the teachers had a limited sense of where their instruction was going; and second, when difficulties were encountered, they had few, if any, alternatives to fall back on.

The teaching behavior of those using the comprehensive plan was found to be more methodical and plan oriented than student oriented; the comprehensive plan appeared to lead to a more rigid instructional environment. This finding is similar to the rigid behavior of teachers who planned that was reported by Zahorik (1970).

An advantage of comprehensive planning became evident when problems were encountered by the comprehensive planners during instruction: their plan served as a ready source of information to consult for help in solving the problems. Having a comprehensive plan, however, did not guarantee successful solutions to problems. If the predictions and expectations of the comprehensive plan were accurate, there was a strong likelihood the plans would be successfully implemented in the classroom; on the other hand, inaccurate predictions of student reactions tended to create frustrations for the teacher which made plan implementation more difficult.

In a second study by Smith and Sendalbach, one teacher's plans were compared with her Science instruction. When developing her plan for instruction, the teacher depended exclusively on the SCIS teacher's guide. The resultant plan contained many but not all of the activities and instructional activities recommended by SCIS. Some of the SCIS recommendations were not included in the teacher's plan because she chose not to follow them. Others were not followed because she either lacked knowledge in the subject matter, had difficulty grasping complex concepts or had problems using the teachers' guide. Instruction resulting from planning of this sort was often poor; furthermore, the plan did not provide the teacher with enough information to help her change direction or generate alternatives when the lesson was going poorly. As a result, the teacher either stuck with her plan or dropped the lesson altogether.

The studies reviewed in this section reveal that in general, once a teacher begins to teach a planned lesson, (s)he is reluctant to alter planned activities or strategies in response to instructional difficulties; instead, his/her pattern is to continue with what has been planned no matter how well the lesson is going. This finding implies that time provided to planned activities is similar to planned time allocations. If true, this would lend support to Harnischfeger and Wiley's notion that a strong relationship exists between plan and classroom practice. But, none of the studies cited specifically addressed this issue. In the present study, we sought to obtain more specific data on the existence and nature of the relationship between planned time allocations and time actually provided for activities.

Planning Models

A number of models have been proposed for describing the instructional planning process. The first, a model of curriculum planning proposed by Tyler (1950), contained four essential steps: (1) specify objectives; (2) select learning activities; (3) organize learning activities; and (4) specify evaluation procedures. His model was later elaborated by Taba (1950) and Popham and Baker (1970). Because of its rational and logical approach to the problem of planning, Tyler's model gained widespread support from educators.

Another model, the "integrated ends means model" (Zahorik, 1975) was proposed by McDonald (1965) and Eisner (1967). They argued that teachers first make decisions about the type of learning activity they want their students to engage in; then in the context of the activity, objectives become articulated as students choose their own learning experiences and pursue their own objectives. Thus, the ends for learning become integrated with the means for learning.

Research has shown that neither the rational/logical model nor the integrated ends means model accurately portray the process of instructional planning. (Zahorik, 1970, 1975; Smith, 1977; Clark and Yinger, 1979; Taylor, 1970; Peterson, Marx and Clark, 1978; Morine, 1977, 1979; Smith and Sendelbach, 1975; Yinger, 1977).

Smith (1977) developed a model of how teachers plan for instruction from responses of elementary teachers to a series of questionnaires and interviews. His model was designed to reflect the influence of three factors: (1) curriculum; (2) pupil cognitive characteristics; and (3) instructional settings. He argued that these factors--Smith called them constraints--guide and shape teachers' decisions as they plan for instruction.

Given these constraints, a teacher's first task according to the Smith model is to develop a weekly subject schedule which conforms to the weekly school schedule: the weekly school schedule is part of the temporal environment and lays out starting times of school in the morning; how much time will be taken for announcements; when groups of students go to special classes such as recess, physical education, art, etc.; when lunch occurs; and when the school day ends. Smith observed that a weekly school schedule generally occurred in a weekly pattern such that all Mondays are identical, Tuesdays, Wednesdays, etc.

The process of formulating the weekly subject schedule is described by Smith as follows:

> "(1) the basic goal is to establish a weekly pattern of subject time allocations; (2) the teacher makes rough determinations of how much time to devote to each subject; (3) the teacher fits these approximations into her weekly school schedule such that she does not have to cross over scheduled breaks and such that each subject appears almost every day." (Smith, 1977, p. 22.)

For the most part, this first step of the model is not repeated again for the remainder of the school year. The schedule may, however, be subject to slight modification between semesters or major vacation breaks.

Development of the weekly subject schedule is seen by Smith as a major component of teacher planning and is likely to remain intact for the school year; in fact, Smith believes it almost completely determines the amount of instructional time that is allocated to various subjects for the year. Clark and Elmore (1979) reported similar findings on the establishment and use of a weekly schedule.

Smith argues that once the weekly subject schedule is determined, the next step in the model is for the teacher to make decisions relating to activities and instructional processes. He sees teacher decisions in this part of the model focusing on activities to pursue within various content areas and the amount of time to allocate to the activities. Smith found that teachers very often consult curricular series for help in making these decisions. He believes, however, that teachers do not rely exclusively on recommendations made by the curricular series; rather they augment the recommendations to varying degrees with information gathered from other sources. Other researchers have reported similar planning behavior. (Smith and Sendelbach, 1979; Clark and Yinger, 1979.)

The final step in Smith's model pertains to decisions teachers make regarding the organization of pupils into various groups for instruction.

The models of instructional planning discussed thus far have dealt primarily with decisions teachers make about content, activities, time, rather than with the actual process by which the decisions are made. The model of instructional planning developed by Yinger (1979) is unique because it emphasized the "...processes of discovery and design rather than the processes of choice." (Yinger, 1980, p. 114.) The Yinger model was developed as a result of his intensive study of the planning and classroom practice of one elementary school teacher.

As Yinger's study progressed, it became clear to him that activities and routines played an important role in the teacher's planning decisions and classroom practice. For Yinger, activities were viewed as

> "...the basic structural units of planning and action in the classroom. Nearly all classroom action and interaction occurred during activities; the remaining time was used for preparing for activities or making transitions between activities." (Yinger, 1980, p. 111.)

Yinger used seven characteristics to define an activity: (1) location, (2) structure and sequence, (3) duration, (4) participants, (5) acceptable student behavior, (6) instructional moves, and (7) content and materials. Thus, an activity in the Yinger study is specifically defined whereas Smith's notion of activity is more generally defined in terms of the subject matter.

Routines established by the teacher were viewed by Yinger as

> "...mechanisms that she used to establish and regulate activities and to simplify planning. Routines played a major role in the teacher's planning. She used them so often that her planning could be described as decision making about the selection, the organization and the sequencing of routines." (Yinger, 1980, p. 111).

These two features of the teacher's planning and classroom practice, i.e., activities and routines, figured heavily in the formation of Yinger's model.

Three stages of decision making are represented in his model: (1) problem finding, (2) problem formulation-solution, and (3) implementation, evaluation and routinization. During the first stage, the teacher deals with the problem of what to teach or as Yinger calls it, "the general teaching dilemma." The problem is probably different for each teacher because of what Yinger calls the unique influences of school and classroom environment and organization, curriculum, resources and pupil characteristics. These influences are nearly identical to what Smith (1977) has called "teacher planning constraints" which he claimed were "...aspects of planning over which the teacher has little control." (Smith, 1977, p. 21.) Yinger postulates that in the problem-finding stages, teachers use a process of discovery to become aware of instructional ideas they think will solve problems posed by the general teaching dilemma. Yinger sees these initial ideas as planning problems which require further elaboration and exploration.

The instructional ideas usually developed by the teacher in Yinger's study concerned activities. His study replicated previous research which found that teacher planning decisions most often focus on activities (Taylor, 1970; Zahorik, 1975; Morine-Dershimer, 1979; Smith and Sendelbach, 1979).

The primary process in the problem formulation and solution stage is the design cycle. Through a process of design the initial idea is repeatedly elaborated and tested until a solution is found. The solution to the planning problem emerges as the problem passes through successive phases of elaboration, investigation and adaptation.

Implementation and evaluation of the activity takes place during the third stage. In this stage, the teacher gathers information which helps him/her decide whether or not to return the activity to the design cycle for further elaboration and adaptation, reject the activity entirely as unworkable, or accept the activity as useful. If only slilght problems develop with an activity, the teacher makes modifications by going back to the design cycle until a feasible solution is reached; then, the revised activity is implemented once again in the classroom. If serious problems develop with an activity so it either cannot be redesigned, or redesign would seriously affect the nature of the activity, it is rejected altogether.

Finally, activities which are successfully implemented undergo a process of routinization. Through this process, the activity becomes a part of the teacher's repetoire of knowledge and experience, thus becoming available for use over and over in the classroom.

One purpose of the Clark and Yinger (1979) planning study mentioned earlier was to replicate part of Yinger's case study; therefore, they analyzed data from that study in terms of Yinger's process model of planning. Results from this analysis showed that most of the teachers began their planning with a general idea and then subjected the idea to successive phases of elaboration before implementing it in the classroom. Teachers varied however in the amount of planning time spent in the different stages of the model. Some teachers, for instance, spent a short time in the problem finding and design stages and considerable more time in the implementation/evaluation/routinization stage. Others spent considerable time in the problem finding stage and less time in classroom tryout. Given these differences, the model proved to be a fairly accurate portrayal of their instructional planning process.

The Yinger and Smith models appear to deal with different aspects of teacher planning and thus should be seen as complements to each other rather than alternative models for describing the same phenomena. Basically, the Smith model explores what teachers plan about (time, activities in content areas and instructional processes) and the sequence of planning decisions, while the Yinger model explains how activities (which for Yinger includes time, content and instructional process) are selected and made ready for use in the classroom.

Activities, however, are the central focus of both models; this is appropriate in light of findings from other studies which have shown that teachers' planning decisions revolve mainly around activities in various content areas.

Because several studies have found that activities occupy a central position in teachers' thinking and actions, we believe that it is appropriate to focus our attention on teachers' planned and actual time allocations to activities.

Time Allocations and Achievement Models

Beginning with Coleman, et al (1966) and later with Mosteller and Moynihan (1972) and Jencks, et al (1972), a notion developed that schooling had little effect on educational achievement. This belief has been quite popular among some researchers; but, in 1976 Wiley challenged this view. He based his challenge on the fact that the assumption was derived from research which asked the wrong question, namely Does schooling have an effect? Wiley argued that educational research ought to begin with the assumption that schooling does have an effect on achievement:

> "It is clear that if a child does not go to school at all, he will not directly benefit from schooling. If a child goes to school every day for a full school year, he will achieve his maximum benefit from that schooling, other circumstances being equal. If he attends school less than the full year but more than not at all, the benefits he derives from schooling should be intermediate." (Wiley in Sewell, et al 1976, p. 227.)

Furthermore, Wiley argued, the length of the school day and year affect exposure to schooling and thus, the benefits a child could expect to derive from it. He concluded, "...quantity of schooling...should be a major determinant of school outcomes." (Wiley, 1976, p. 227.)

In an effort to build support for his assumptions, Wiley (Wiley in Sewell, et al, 1976) analyzed data from the sixth grade sample of the EEOS. Analysis was focused by his model of schooling exposure and achievement. Outcome measures were verbal ability, reading comprehension and mathematics achievement.

Results of a school-level regression analysis lead him to the following conclusion:

> "...in schools where students receive 24% more schooling, they will increase their average gain in reading comprehension by two thirds and their gains in mathematics and verbal skills by more than one third." (Wiley and Harnischfeger, 1974, p. 9.)

Wiley concluded that these results confirmed his assumption that the quantity of schooling a child receives has an important effect on his achievement. Wiley felt, however, that his concept needed to be further developed so as to better detail the effect of time on learning. Carrol's (1963) model of school learning in which time played a primary role served as the basis for this development.

In the Carrol model, degree of learning is a function of time actually spent and time needed to learn. The equation is as follows:

$$\text{degree of learning} = f \; \frac{\text{time actually spent}}{\text{time needed}}$$

Wiley and Harnischfeger (1974) analyzed this equation and determined thát time actually spent is the product of three factors: total allocated exposure time (w); percent active learning time (x); and percent usable exposure time (y) (Wiley and Harnischfeger, 1974, p. 11.) A pupil's achievement can then be specified by the following equation:

$$\text{achievement} = f \; \frac{w \cdot x \cdot y}{\text{total needed learning time}}$$

Teacher planning and classroom practice play a crucial role in determining what values the factors w, and y will take for students in a classroom. Total allocated exposure time (w) is thought to be influenced by teachers preactive planning decisions (Smith, 1977), while percent of usable exposure time (y) is a function of teacher interactive decisions which in turn, appear to be influenced by teacher planning decisions. (Clark and Yinger, 1979; Morine-Dershimer, 1979; Morine Vallance, 1975; Peterson and Clark, 1978, Zahorik, 1970). A teacher's skill in managing the classroom coupled with student aptitude, his ability to understand instruction, his perseverence are all important determinants of the percent of active learning time (x) (Harnischfeger and Wiley, 1976).

Following development of the achievement model, Harnischfeger and Wiley designed a model of the teaching-learning process. A basic construct of this model is time. Their goal in designing the model was to

> "...represent the teacher's activities as consequences of educational policies and of the teacher's own reflection, and at the same time, represent the pupil's achievement as the consequences of his activity and experience." (Harnischfeger and Wiley, 1976, p. 6.)

Harnischfeger and Wiley contend that their model focuses attention "...on what pupils learn in school (their achievement) and on how they learn what they learn..." i.e. conditions of school learning (Harnischfeger and Wiley, 1976, p. 11). Such a focus is critical they argue because "...the influences on pupil acquisition operate solely through the pursuits of pupils." By pursuits they mean "...what teachers and students do in the process of teaching and learning." (Harnischfeger and Wiley, 1976, p. 11.) The teacher is seen as the "key person" in all pupil activities because (s)he "controls the design and execution of pupil pursuits." (Harnischfeger and Wiley, 1976, p. 36.)

The model specifies four categories of teacher activities basic to the teaching-learning process: planning, implementation, inducing and communication. For Harnischfeger and Wiley, planning involves preactive decision making about materials, content and time allocations, scheduling of activities, instructional strategies, grouping, and supervision. Implementation implies conformity between plan and actuality. They argue that teacher decisions made during the instructional day have an effect on the degree to which the plan comes to fruition in the classroom. Other factors believed by Harnischfeger and Wiley to affect implementation are teachers' managerial skills and how realistic the plan is in terms of pupil characteristics and abilities and how accurately the teacher can predict time required for learning. Inducing has to do with the teacher's ability to motivate his/her students to learn; it influences the degree of student task involvement. Teacher ability to communicate ideas and directions facilitates learning for those students who are attentive and involved in instructional activities. Pupil ability to understand and use his active learning time most efficiently is dependent on careful communication.

The role of these four teacher activities in pupil learning is summarized by Harnischfeger and Wiley in this way:

> "Carefully crafted teaching plans facilitate the intended learnings through a broad range of implementation; they allow the selected curricula, and no others, to be taught. Sound implementation further facilitates pupil achievement. Motivating and monitoring skills lead to greater learning, because pupils work harder and spend more time trying to learn. Well structured and clear communications raise learning grades when pupils are watching and listening. (Harnischfeger and Wiley, 1976, p. 23.)

Together, these four teacher activities affect the amount of time pupils spend in active learning, which in turn affects their achievement.

It is reasonable to assume that teachers' skills in these four areas are not the same. Assuming they are not, how then do teachers differ in these areas and what effect does a teacher's behavior in each of these four areas have on opportunity to learn? In the present study, the first two teacher behaviors specified by the Harnischfeger-Wiley teaching/learning model—planning and plan implementation—were investigated to determine what effect they had on opportunity to learn.

Summary

Teachers devote a considerable amount of their time to planning. A principal outcome of a teacher's planning activity is a subject and time allocation schedule (planned time allocation schedule). It is often recorded in written form. The intended purpose of the planned time allocation schedule is to insure that when school is in session, the proper amount of time (for the most part determined by the teacher) is allocated to all the various school activities; but, to what extent do teachers adhere to their planned time allocations? Harnischfeger and Wiley have suggested there is a close relationship between how a teacher plans to use time and how time is actually used. The findings from some research on planning and teacher decisions hint that they might be correct in their assumption (Smith, 1979; Smith and Sendelbach, 1979; Peterson and Clark, 1978; Morine-Vallance, 1975; Morine-Dershimer, 1979; Zahorik, 1970; Clark and Yinger, 1979). These studies, however, investigated only a small segment of the teaching-learning situation (findings were based on fewer than ten lessons which were either prescribed or suggested by the researcher) and none of them specifically addressed questions pertaining to the relationship between planned time allocations and actual time allocations. Lack of research on this aspect of teacher practice led us to design a study that sought to provide answers to questions concerned with the relationship between planned time allocations and actual time allocations. These questions are as follows: (1) to what extent are teachers' planned time allocations associated with their actual time allocations? (2) what is the nature of the relationship between planned time allocations and actual time allocations? (3) are planned time allocations of particular planned activities altered more often and/or to a greater extent than the planned time allocations of other planned activities? (4) are all planned activities allocated time in the classroom? These and similar questions were investigated in a natural setting over a fairly long period of time, thus minimizing any influence the study might have had on teacher decisions about time.

The work of Carrol, Wiley, and Harnischfeger and Wiley strongly suggests the notion that quantity of schooling has an effect on a student's achievements. The effect can be summarized in this way: the greater the opportunity a student has to learn, the greater his/her achievement will be (Carroll, 1963; Wiley, 1976; Wiley and Harnischfeger, 1974; Harnischfeger and Wiley, 1976). The research cited suggests that time decisions made by teachers play a significant role in determining opportunity; thus, teacher time decisions are an important area of teacher practice to study.

CHAPTER 3

RESEARCH METHODS

Introduction

The purpose of this study was to investigate and describe the relationship between teachers' planned and actual time allocations. Descriptive research does not have as its goal or aim a testing of hypotheses; instead, it is directed toward determining the nature of a situation as it exists at the time of the study. Knowledge of the teaching-learning situation generated from such a study can be of value to teachers and teacher educators. According to Good and Power (1976) generalizations

> "...derived from classroom research and theory have a different role from those of the natural sciences. They function not as predictors of future events but as guidelines for understanding particular situations and context. Thus, at best, generalizations about teaching derived from research act as guides to assessing the likely consequences of alternative strategies in complex educational situations. Such generalizations must necessarily be indeterminant since they cannot predict precisely what will happen in a particular case. But this does not decrease their value for the teacher; ..." (Good and Power, 1976, p. 47.)

Clark and Yinger (1980) argue that "it is important to examine and describe the behavior of experienced and successful practitioners who have developed methods and strategies for functioning effectively in the teacher environment." (Clark and Yinger, 1980, p. 4.) They believe that models based on understanding derived from such research will be more effective than trying to use models borrowed from other disciplines.

The Study

Overview

This study was part of a larger study conducted by the Language Arts Project (LATIM) of the IRT at Michigan State University. In general, the LATIM study had as its aim the investigation of the relationship between time and learning.

Data for the study being reported here were gathered in two ways: (1) through observations in elementary classrooms; and (2) through teachers' self-report of their teaching plans as recorded in their written plan book. Data collection occurred over a period of three months from the beginning of March through the first week of June.

Observers in each classroom adopted the role of participant-as-observer, a role described by Wolcott as one "in which the observer is known to all and is present in the system as a scientific observer, participating by his presence but at the same time usually allowed to do what observers do rather than expected to perform as others perform." (Wolcott, 1973). In this role observers attempted to be unobtrusive and objective as they recorded instructional and non-instructional activities of teacher and pupils.

Observation and plan data were first of all compared by use of descriptive statistics. This approach permitted us to summarize and describe (1) the allocation of time as reported in teachers' plans; (2) use of time in the classroom as reported by observers notes; (3) similarities and differences between plan and observation data; and (4) the extent of the association between the two sets of sample data.

Secondly, regression analyses were used. This technique permitted us to describe the nature of the relationship between teachers' planned and actual time allocations through the use of a regression model.

Research Questions

The basic research question for this study was: what is the relationship between a teacher's planned time allocations and his/her actual time allocations?[1] More specific questions relating to this basic question fall into two main categories. The first category includes questions about the general pattern of teachers' planned and actual use of time. Specific questions in this category are summarized under two major questions: 1) What is the general pattern of teachers' planned time allocations? and 2) What is the general pattern of teachers' actual time allocations?

Questions which fall under the first major question are:

a. How much time do teachers allocate in their plans to activities in each of the content areas?

b. What is the planned frequency of activities in each content area?

c. How do teachers' planned time allocations vary within each content area?

d. How much time do teachers leave unallocated in their plan?

Questions which fall under the second major question are:

a. How much time do teachers provide to activities in each of the content areas?

b. What is the actual frequency of activities in each content area?

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[1] For the remainder of this paper, this relationship will be referred to as a "time decision pattern."

c. How do teachers' actual time allocations vary within each content area?

d. How much time do teachers provide for unplanned activities?

The second category includes questions about how teachers' planned and actual time allocations compare with each other:

a. What is the correlation between teachers' planned and actual time allocations?

b. Are teachers' planned and actual time allocations linearly related?

c. What model best describes teachers' time decision patterns?

d. How do models of teachers' time decision patterns deviate from the logical model?

e. How do models of teachers' time decision patterns deviate from the theoretical models of teachers' time decision patterns?

f. How do teachers' actual time allocations deviate from the model which best describes their time decision pattern?

Answers to these questions will increase our understanding of teachers' planning decisions regarding time and how their decisions relate to classroom use of time.

Sample

An overall goal of the selection process was to select a group of elementary school teachers from different school settings which typified diversity with respect to such things as gender, experience, education and classroom organization. Additional critieria for selection included: (1) must currently teach in at least one of the grades between second and fifth; and (2) must practice effective classroom management as judged by their peers and principal. To be selected, a teacher had to satisfy both of these conditions.

Through peer and administrator recommendations, a group of teachers was identified which exemplified the diversity which we desired and which met the grade level and classroom management criteria. Out of this group of teachers, seven volunteered for payment to participate. Table 3.1 provides more specific information about each teacher who participated in the study.

The seven teachers were from schools located in three different school districts around Lansing, Michigan. The number of students in each school district ranged from about 3,300 to about 4,700. The number of full-time teachers in each district was such that the pupil/teacher ratio was about the same for classrooms in all three districts. Additional information about each school district is contained in Table 3.2.

Four types of classrooms were represented in the study: (1) three self-contained second grade classrooms; (2) one second-third grade combination classroom which was part of a four classroom multi-aged grouping situation team taught within an open classroom (only one of the teachers in this team participated in the study); (3) one fifth grade classroom partially self-contained with departmentalization in Mathematics, Reading and Social Studies; and (4) two fourth-fifth grade combination classrooms team taught within an open classroom (both of the teachers in this team participated).[2]

[2]Observational and plan data collected from one of the teachers of the self-contained second grade classroom was not included in analyses. This decision was made because the observation and planned data could not be coded according to the scheme developed for coding in this study.

Table 3.1

Demographic Data on Participating Teachers

School District	Teacher	Age	Gender	Years' Experience	Grade Level	Degree	Undergraduate Major	Graduate Major	Classroom Setting
1	1	29	F	6	4/5	BA MA	Social Work	Language Arts	Team
1	2	29	F	8	4/5	BA MA	Math Science	Reading	Team
2	3	32	M	4	2	BA	Math Science	N/A	Self-Contained
2	4	40	F	10	2	BA MA	Occupational Therapy	Reading	Self-Contained
3	5	46	M	9	5	BA	English	N/A	Self-Contained Departmental
2	6	27	F	6	2	BA MA	Math Science	Reading	Self-Contained
2	7	28	F	7	2/3	BA MA	Language Arts	Language Arts	Team

Table 3.2

Description of Participating School Districts

School District	Type of District	Number of Full Time Teachers	Number of Students	General Description of Community Adult Population
1	Suburban	187	3270	Upper Middle Class
2	Suburban	274	4659	Upper Middle Class
3	Small town/ Rural	220	4500	Middle Class

Instruments

Data for analyses were collected by use of an observation instrument and teacher daily written plans. Background information on each teacher—it did not figure in analyses—was provided by a questionnaire and an interview.

The observation instrument allowed the observers to compile structured field notes of classroom activities. Observers kept a running account of the day. Beginning and ending times of activities one-half minute or longer were recorded for each student and his/her teacher. Type and location of activity, grouping for the activity, teacher strategies employed, content and materials used were also recorded. When possible, copies of the actual assignments were included. A copy of an observation is shown in Appendix 3.1.

Before the study actually began, observers tried out the observation instrument in two different classrooms. This pilot process will be discussed in more detail later in the chapter.

The second instrument used was teachers' self-report of their instructional intentions as contained in their daily written lesson plans. Directions on what to include in the lesson plan were quite simple: teachers were instructed by the researchers to write down in their lesson plan book (or in a similar document) what they planned to do each day in the classroom as well as the time when each activity was supposed to occur. We emphasized that they should follow their normal practice when writing out their lesson plans no matter how detailed or sketchy the plans might be.

These original written lesson plans were collected at the end of each week. In several cases teachers requested that we return the originals after making a photocopy of them. This was done.

For the most part, written lesson plans contained information about starting and ending times for activities and/or content areas; some information pertaining to instructional grouping strategies, supervisory strategies and materials to be used was also included. Most of the information on groups related to either whole groups or subgroups of students, e.g., Reading groups. Very little information pertained to goals or objectives, instructional strategies or to individual students. Several days of one teacher's lesson plans are included in Appendix 3.2.

Written plans from teachers in this study appear to be similar to written plans produced by teachers in other studies (Morine, 1977; Yinger, 1977; Clark and Yinger, 1979). The plans also are similar to the written plans of the many teachers we have observed during the sixteen years we have worked in the field of education.

The questionnaire used to obtain supplementary data on each teacher requested the following information:

1. Educational background of the teacher;

2. Classroom information not easily discernible through observations, i.e., goals, purposes, attitudes;

3. Factors that influence the teacher's choice of curriculum materials;

4. Teacher interests and degree of enjoyment in teaching certain content areas;

5. Teacher perceptions of student ability levels in Reading and Language Arts;

6. Teacher perceptions of the importance of various content areas;

7. The degree to which various external factors affect curriculum choices.

Procedure

This study was designed to occur in two phases, a pilot training phase and a data collection phase. In the pilot training phase, observation techniques were tried out with two teachers who volunteered to act as pilot teachers. Neither of these teachers participated in the subsequent study. Both pilot teachers taught in a middle elementary grade in one of the school districts eventually represented in the study.

Pilot of Observation Techniques and Training of Observers

There were three purposes for the observation pilot: (1) determine the extent to which classroom observers recorded information consistent with the observation guidelines; (2) refine observation guidelines and observer techniques; and (3) determine the level of inter-observer reliability.

During March 1978, seven observers spent a total of two days observing in a pilot teacher's classroom. Pilot observations occurred in one to three hour segments. Two or three observers recorded notes on the same classroom activities during this time.

Following each observation session, observers met with the project director and discussed the pilot observation. Based on the first pilot observation, observers expressed doubt that they recorded the kind of detailed information which the study required. After considerable discussion on this matter, we concluded that their problems were the consequence of two temporary conditions. First, observers were unfamiliar with the school, teacher, students and classroom procedures. As a result, their notes were sketchy and lacked much pertinent information. Second, students were not accustomed to having an observer in the classroom and the observer's presence aroused considerable curiosity in the students. Student curiosity caused them to react in several different ways: some huddled in small groups and chatted about the observer and what he was doing; several periodically sauntered by the observer being careful to inspect his notes as they went by; bolder students openly questioned the observer about why (s)he was in the classroom; others just sat and stared at the observer.

No doubt some students would have behaved in a similar fashion if the observer had not been present. But based on the pilot teacher's reflections, it was concluded that student behavior was so different that normal flow of classroom activities was materially disrupted. These out-of-the-ordinary student behaviors coupled with the observers' problem of unfamiliarity adversely affected the kind and quality of the information recorded by the observer. It was believed that over time, problems associated with student and observer unfamiliarity would gradually disappear. After a day or two in the classroom, we reasoned, the observer would become much more familiar with the classroom milieu and students would grow accustomed to the presence of the observer and begin to behave in a more characteristic way. Subsequent reports from the pilot teachers and observers indicated that our reasoning proved correct. Usually by the end of the second day, the problems created by unfamiliarity began to disappear.

As a result of this experience, a set of procedures was developed for the observer (Appendix 3.3). Further, it was decided that a get-acquainted period should occur before any of the study's observations began. Each of the seven observers were required to visit his/her assigned classroom for a minimum of one school day prior to doing any formal observation. During this get acquainted period, observers were to move about the classroom and briefly chat with students and learn their names, become familiar with the materials used in the classroom, and try to get a handle on the various patterns and procedures of classroom practice. Observers were also instructed to take notes so students would begin to grow accustomed to the observer writing things down in a notebook. We strongly urged participating teachers to allow some sort of question and answer period with the observer and students during these get acquainted periods.

By the end of the two day pilot, observers were quite proficient at recording significant features of classroom activities required by the observer guidelines. The quality of their written observations as well as verbal reports from observers made it clear that no changes were necessary in the guidelines.

Some observers felt that they needed to become better acquainted with the guidelines. To help them achieve this goal, a comprehensive review session of all guidelines was conducted before the first observation. At this session, all observers met together and discussed the guidelines in depth. This experience served to solidify each observer's conceptions of the guidelines.

Inter-observer reliability regarding content and time intervals recorded in the observations proved to be fairly high. When reporting on identical classroom activities, observers were in very close agreement on the main features of it, i.e., students involved, type of grouping, kind of content, substance of teachers' comments.

With regard to beginning and ending times of activities, some discrepancies were noted. It was expected that this would occur due to differences in the timekeeping devices, patterns of scanning the room, writing speed, etc. As a result of these differences, elapsed times reported by different observers of the same activity varied somewhat. For lengthy activities, the differences in elapsed time was less than two minutes. For activities of fairly short duration, the differences were considerably less than one minute. This degree of error was deemed acceptable. We anticipated that as the observers gained more experience, they would become even more accurate in their recording of beginning and ending times.

The form that observers' written notes took became fairly standardized during the piloting process. Beginning and ending times were noted along the left side margin of the paper. Phrases were used to identify activities which took place in the classroom. Students first names along with student numbers were used interchangeably to identify students. Often, observers were able to capture teacher talk in fairly great detail.

Before data collection began, each observer met separately with the teacher whom (s)he would observe. During this meeting, the observer was expected to gather information which might help him/her do a more accurate job of recording classroom activities. Of particular interest were: (1) list of student names; (2) daily time schedule and schedule of events which occurred with regularity; (3) names of students in subgroups of content areas such as Math and Reading; (4) description of activities which occur with great regularity within the classroom; and (5) materials used by the teacher.

Also during this meeting, observers stressed to the teachers to plan and conduct their classroom activities as nearly normal as possible. Observers reminded the teachers to make their daily written lesson plans available to the researcher to keep or to copy.

This meeting was also intended to be of benefit to the teacher. It was a time when the teacher and observer could become better acquainted, thus, helping to reduce any anxiety either might have in anticipation of classroom observations.

At no time before or during observations were any of the teachers told that the study was seeking to learn about teacher planning, about how teachers use plans in classrooms, or about how time was used in school. The study was billed as an effort to gather information which might help us better describe classroom teaching and teaching practices.

Data Collection

Data were collected over a period of three months from the beginnin of March through the first week in June. Once a week for twelve consecutive weeks, observers collected teachers' daily written lesson plans from the previous week. The seven observers made full-day observations once a week for nine of the twelve weeks.[3] Each day of the week was observed at least once.

Handwritten observation notes were typed as soon as possible and then reviewed by the observer to make sure no errors in typing were made.

At the beginning of the twelve week study, teachers were given the questionnaire. They were asked to complete it as soon as possible and to return it to the observer. In most cases, the questionnaire was completed well before the end of the study.

The interview with each teacher was conducted toward the end of May or the first week in June. During the interview, the interviewer took notes and also audio-recorded the complete interview. The audio-tapes were reviewed by the interviewer and any corrections made. Notes taken by the interviewer were written directly on the interview schedule.

Data Reduction

A coding scheme and conventions were developed for coding observations and plans. (Appendix 3.4)

To facilitate analyses, seven categories of activities were developed. Any activity specified in either the observed or planned day could then be coded in one of seven different ways. Each activity category was broadly named so that it could contain a number of activities which had a similar content focus. The seven categories and the activities which fall into each one are shown in Table 3.3.

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[3] In some cases, only eight observations were completed.

Table 3.3
Content Categories Used for Analyses

1 Language Arts	2 Reading	3 Mathematics	4 Science	5 Transitions	6 Break	7 Enrichment
oral communication	word analysis	any activity in which the predominant focus was one of the following	physical & biological science	management	lunch	art
drama	word meaning	computation	social science	transition	recess	music
penmanship	text analysis	graphs	values	safety drills	opening exercises	physical education
spelling	listening to oral reading	equations/ number sentences	social attitudes		parties	movies with no clear content
punctuation	silent reading	geometry/shapes	behaviors		social activities	unusual combinations[1]
grammar/usage	group reading	counting/numbers				field trips
sentence composition	combination reading activities	measurement				fine art combinations
writing instruction		money				unclassified activities
information gathering						assemblies
literary forms						
combination language activities						

[1] Class study halls when many different content areas are being pursued by students.

Training and Reliability of Coders

Individuals who coded observations[4] participated in an extensive training program in which actual observations were used.

The first step in the training process involved an extensive review and discussion of the coding scheme and all coding conventions. After discussion of each major component of the conventions, coders received a partial observation on which to practice. After this partial observation was coded, all coders met together again and reviewed what they had done. Problems encountered in coding and discrepancies which occurred between coders were discussed in detail. This process was repeated several times until all coding conventions had been discussed and practiced. Coders then received an observation of a full day and practiced coding it in its entirety. Once again, after completing it, coders met together and discussed coding problems and discrepancies. Practice coding of entire observations continued several more times. Eventually, all coders were coding an observation in substantially the same way.

After actual coding of observations began, a program was instituted to determine intercoder reliability. Coders were divided into pairs and each pair was given the same observation to code. In all, four different observations were coded in this way.

Analyses were done to determine the extent to which two different coders agreed when coding the same activity. We found that two different coders coding the same observations agreed eighty to ninety percent of the time. Discrepancies which did occur were not major. In general, coders agreed on the type of activity which occurred but occasionally

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[4]After all observations were coded, just one of the coders coded teachers' plans for each observed day.

disagreed on the exact starting or ending time of it.

A system of checking was used to identify mechanical errors which cropped up in the coding process. A series of random checks was also made on each coded day to identify such things as numbers out of order on the code form, numbers of the wrong magnitude, times that might be out of sequence, or time segments in which activities were not listed. If too many errors were noted, then the entire day was checked for coding accuracy.

Observation data. Initially, all observational data were coded for each teacher and each of his/her students. Information that was coded consisted of the beginning and ending times of every activity which was thirty seconds or longer for each individual student and the content of the activity. As a result of this coding scheme, the activity of each student and teachers was accounted for during every one-half minute of the entire school day. (See Appendix 3.5 for coding of one student's activities from observation shown in Appendix 3.1)

From this coded information, the data were aggregated so that a class activity could be coded for every minute of the school day in each classroom. The same coding scheme and conventions that were used to code individual student activities were used in this step of the data reduction process.

This step became necessary because the size of the groups associated with time and content allocations of the observation data differed from those of the plan data. Typically, observation data identified the time individual students or small groups of students spent on various activities. But, plan data identified the time the whole class would spend on various activities throughout the school day.

Occasionally, teachers allocated time in their plans to subgroups of students; but most often, all subgroups were expected to work on activities in the same content areas. Even in this case then, a teacher's planned time allocations were associated with the whole class.

Occasionally, a teacher's planned time allocations were to subgroups of students, each of which were to work on activities in different content areas. In this case, the class was coded as working on a combination activity. (Combination activities will be explained below.)

Therefore, in order to compare a teacher's actual observed time allocations with his/her planned time allocations, the actual activities of his/her whole class needed to be identified. This was done by aggregating the observed activities of individual students in each class to a class activity.

We defined a class activity as one in which at least eighty percent of the students in a classroom were working on the same activity. For example, if twenty-five out of thirty students in a class were working on a Reading assignment during some time segment, e.g., 9:30-10:15, then that time segment would be coded as a class activity in Reading. If less than eighty percent of the students in a class were working on the same activity during some time segment, then that time segment would be coded as a combination class activity in a content area such as Reading-Math or Language Arts-Reading-Math. Combination class activities did not occur too often, however. A list of those which did occur is given in Appendix 3.6.

The aggregation of observed activities of individual students in a class to class activities is illustrated by the following example in Figure 3.1. It depicts a hypothetical morning observation. The observation contains individual, subgroup and whole-group activities. This example is typical of the observation data collected in this study.

Beginning Time	Activity
9:15	Transition
9:20	Opening exercises
9:30	All students begin Reading exercises
9:32	Students 1-10 in Reading group, other students (11-28) working exercises in their Reading workbook
9:55	Student 12 goes to the office
9:58	Student 12 returns and resumes work in Reading workbook
9:59	Students 11-28 now in Reading group and students 1-10 working in their Reading workbook
10:15	Student 15 doing a Math ditto
10:20	Student 18 writing a letter to Pen Pal
10:22	All but students 15 and 18 reading in Reading text
10:25	Class prepares to go out to play
10:30	Recess
10:55	Class gets materials out for Math class
10:59	All math groups doing Math dittos
11:25	Students 1-10 in library to work on readers guide Students 11-28 are watching a Science film
12:00	Class goes to lunch

Figure 3.1
Hypothetical Observation

Clearly, the activities which occurred at 9:15, 9:20, 9:30, 10:25, 10:30, 10:55, and 10:59 were whole group activities. Thus, each of these time segments would be coded as a class activity.

During the time period from 9:30-10:25, all but three of the students (12, 15, and 18) were working on Reading activities. Therefore, this time segment would also be coded as a class activity (twenty-five out of twenty-eight students were working on Reading activities).

From 11:25-12:00 noon, one group of ten students was in the library, while another group containing eighteen students was doing a Science activity. Since less than eighty percent of the students were working on the same activity, this time segment would be coded as a combination class activity in Language Arts/Science.

The result of aggregating individual and subgroup student activity of the hypothetical observation to class activities is shown in Figure 3.2.

Beginning Time		Class Activity	Elapsed Time (Minutes)
1	9:15	Transition	5
2	9:20	Break	10
3	9:30	Reading	55
4	10:25	Transition	5
5	10:30	Break	25
6	10:55	Transition	4
7	10:59	Math	26
8	11:25	Language Arts/Science (combination)	35
9	12:00	Break	—

Figure 3.2
Class Activities From Hypothetical Observation.

Not every observation was aggregated as simply as was this example; but, each observation could be coded for class activities with only a minimal loss of information and with very little reliance on combination activities.

Plan data. Daily lesson plans were coded in a similar fashion. (See Appendix 3.7 for coding of one teacher's planned time allocations for one day.) However, the plans normally did not contain information about individual pupil activities as did the observations. Most often plan data provided only subgroup and whole group designations. So, instead of coding the plans at the individual student level first, they were first coded at the subgroup level. Finally, coded subgroup information was aggregated so that a class activity could be identified for every minute of the school day. Like the observation data, beginning and elapsed times were coded for each class activity.

Almost without exception, coding and aggregation of data were completed at the same time. This was possible because class activities were quite easy to identify in the plans. Figure 3.3 provides an illustration; it is typical of the plans submitted by teachers in this study. The hypothetical plan covers the same day as the hypothetical observation shown in Figure 3.1.

Many of the planning statements shown in Figure 3.3 are, for all practical purposes, stated as class activities. Other planning statements concerned activities of subgroups which can easily be aggregated into class activities since each time subgroups are indicated, it is intended that each group work in the same content area.

The way in which the hypothetical plan would be coded for class activities appears in Figure 3.4.

Analyses

Unit of Analysis

Each observed and planned day was divided into parts we called intervals. Intervals in plans were called planned intervals, while those in observations were called observed intervals. An interval contains two pieces of information, a name and a numerical value. The class activity serves to name each planned and observed interval. The value of an interval is the elapsed time of the class activity. For a planned interval, elapsed time is the length of time in minutes allocated to a class activity. The value of an observed interval is the length of time in minutes a class activity actually lasts.

Beginning Time	Activities
9:15	Opening exercises
9:20	Reading--
	Group 1 discuss pp. 201-210 Group 1, 2, 3 do workbook pp. 15-18 when not in reading circle
9:45	Group 2 discuss workbook pp. 10-15
10:10	Group 3 discuss vocabulary words for new story
10:20	Recess
10:40	Read to class from <u>Circus</u> book
11:00	Math--
	Group A do p. 184 set 1 and 2 Group B do p. 38, problems 2, 8, 10, 12, 18
11:30	Science film and library
12:00	Lunch

Figure 3.3
Hypothetical Plan

	Beginning Time	Class Activity	Elapsed Time
1	9:15	Break	5
2	9:20	Reading	60
3	10:20	Break	20
4	10:40	Reading	20
5	11:00	Math	30
6	11:30	Science/Language Arts (combination)	30
7	12:00	Break	—

Figure 3.4
Class Activities From Hypothetical Plan

Elapsed time, whether for planned or observed intervals, was found by subtracting the starting time of each class activity from the starting time of the class activity immediately following it. For example, in Figure 3.4, Break started at 9:15. The class activity immediately following Break was Reading; its starting time was 9:20. Thus, the elapsed time for Break was 5 minutes (9:20 - 9:15 = 5).

Elapsed time for planned intervals was called a teacher's planned time allocation and for observed intervals, elapsed time was called a teacher's actual time allocation. The relationship between a teacher's planned use of available school time and how (s)he actually used it was investigated by comparing his/her planned intervals with his/her observed intervals.

Method of Comparing Planned and Observed Intervals

Comparisons were made through the use of matched intervals. A matched interval was defined as an interval which contained the name and value of just one observed and one planned interval. Planned and observed interval names were the primary consideration in the development of matched intervals.

The first step in the formation of matched intervals was to sequentially number each observed interval. The first observed interval to occur in the school day was assigned the number 1, the second to occur the number 2, the third, number 3, etc. This numbering system was not a factor considered in analyses; it was used only to make the process of forming matched intervals less confusing.

An example of the way observed intervals were numbered is shown in Figure 3.2. The observed interval which begins at 9:15 was assigned the number 1. The next observed interval to occur was Break at 9:20;

it was assigned the number 2. In all, there are nine observed intervals shown in Figure 3.2.

Next, we matched the first observed interval of an observed day with a planned interval of the same observed day which had the same name and a similar value.[5] Thus, we assumed that an observed interval was planned if a planned interval of the same name and similar value existed in the teacher's plan. The time in the school day when a planned interval was intended to occur was not considered in the formation of matched intervals, even if the beginning time of the observed interval differed considerably from that of the planned interval. Normally, however, the beginning time of each observed interval was similar to the beginning time of its matching planned interval.

If there was no planned interval of the same name to match with an observed interval, then the observed interval was matched with a planned interval we called "unplanned." The unplanned interval did not have a beginning or ending time, thus its elapsed time was set at zero.

This matching process continued until all observed intervals in each observed day were matched with a planned or unplanned interval from the teacher's plan for the observed day.

Often after each observed interval of the school day was matched with a planned or unplanned interval, there were some planned intervals which did not have matching observed intervals. This situation existed because teachers did not always provide time during the school day for

[5]When two (or sometimes three) observed intervals of the same name were separated by a short break that was initiated by factor(s) outside the classroom, then the two (or more) observed intervals were treated as one interval. Its value was the sum of the observed intervals separated by such breaks. The elapsed time of the intervening break(s) were then added on to the elapsed time of the next observed break which occurred.

every class activity which they had planned. In these cases, the planned intervals were matched with an observed interval we called "unobserved." Since the planned class activity of these planned intervals did not occur, there was no observed beginning or ending time for it. The elapsed time of the unobserved interval then was set at zero.

There were three types of matched intervals then which were used for analyses: the observed-planned interval; the observed-unplanned interval; and the unobserved-planned interval. Each matched pair represented a single case for the purposes of analyses. In all, there were 1,101 matched intervals (cases).

An example of how observed and planned intervals were used to form matched intervals is depicted in Figure 3.5. In this example, the hypothetical observed (Figure 3.2) and planned intervals (Figure 3.4) were used.

As can be seen from Figure 3.5, there were no planned intervals of the same name for observed intervals one, four and six. These observed intervals then were matched with the unplanned interval. All of the other observed intervals, however, could be matched with a planned interval of the same name.

After all observed intervals were matched with a planned interval, there was one planned interval (Reading at 10:40) which remained unmatched with an observed interval; thus, it was matched with the unobserved interval.

The matching process involving the hypothetical observed and planned intervals yielded nine matched intervals. Each of these nine intervals would be considered a single case for analyses.

During analyses, the value (actual time allocation) of the

	Sample Observation "B"			Sample Plan "A"			
		INTERVAL			INTERVAL		
Number	Value	Starting Time	Class Activity	Value	Starting Time	Class Activity	Matched Interval
01	5	9:15	Transition	0	—	Unplanned	1
02	10	9:20	Break	15	9:15	Break	2
03	55	9:30	Reading	60	9:20	Reading	3
04	5	10:25	Transition	0	—	Unplanned	4
05	25	10:30	Break	20	10:20	Break	5
	0	—	Unobserved	20	10:40	Reading	6
06	5	10:55	Transition	0	—	Unplanned	7
07	30	11:00	Math	30	11:00	Math	8
08	35	11:30	Language/Science	30	11:30	Language/Science	9
09	—	12:00	Break	—	12:00	Break	10

Figure 3.5

Hypothetical Observed and Planned Intervals Matched observed (or unobserved) interval in each matched interval was compared with the value (planned time allocation) of the planned (or unplanned) interval of the same matched interval. For example, in the second matched interval in Figure 3.5, the actual time allocation for Break would be compared with the planned time allocation of Break which was planned to begin at 9:15. For this one case, descriptive statistics would reveal a difference of five minutes between them.

Statistical Techniques

Matched intervals were subjected to two levels of analyses. In the first level, descriptive statistics were used to describe and summarize the values (scores) of planned, observed, unplanned, unobserved intervals and compute differences between them for different class activities. Three statistical techniques were employed: (1) measures of central tendency; (2) measures of variability; and (3) correlation. The measure of typical value was the mean.

In the second level, regression analyses were performed on the matched intervals. The value of the planned interval was the independent variable and the value of the observed interval was the dependent variable. Regression analysis allowed us to model the relationship between a teacher's planned time allocations (the independent variable) and his/her actual time allocations (the dependent variable).

For this analysis, the linear regression equation ($\bar{Y} = b_o + b_1x$) was used. To determine the nature of the relationship, we focused our attention on b_1, the slope of the regression line. If regression analysis showed that $b_1 \neq 0$, then the relationship between a teacher's planned and observed time allocations was modeled as a linear relationship, at least as an approximation.

In general, the regression coefficient b_1 provided insight into a teacher's planned use of time in the classroom while the regression coefficient b_o provided insight into a teacher's unplanned use of time in the classroom.

Models developed as a result of regression analysis were then visually compared first of all to the logical model and then to the theoretical models.[6]

Summary

The purpose of this study was to describe the relationship between teachers' planned time allocations and their actual time allocations. Data for the study were gathered from seven elementary classroom teachers through observation in their classrooms and review of their written plans. At least eight full-day observations were conducted in each of the seven classrooms.

The data were coded according to a coding scheme developed for this study. Coded data were analyzed through the use of descriptive statistical techniques as well as regression analysis. The linear regression equation ($\bar{Y} = b_o + b_1x$) was used. The relationship between each teacher's planned and actual time allocations was thus modeled using the results of regression analyses. Regression models were then visually compared with the logical and theoretical models.

In the next chapter, theoretical models of teacher time decision patterns are discussed.

[6]Logical and theoretical models will be discussed in Chapter 4.

CHAPTER 4

THEORETICAL MODELS OF TEACHER TIME DECISION PATTERNS

Introduction

The purpose of this chapter is to examine the relationship between the independent variable planned time allocations (x) and the dependent variable actual time allocations (y).

For this study, we assume a linear relationship between the two variables x and y. In other words, we believe a teacher's time decision pattern is linear. This assumption seems reasonable for several reasons. First, prior research suggests that teachers most often employ the instructional, grouping strategies and materials they have stated in their plans (Peterson and Clark, 1978; Morine and Vallance, 1975; Zahorik, 1970). This finding leads us to assume that teachers will also closely adhere to planned time allocations as stated in their written plans. Second, most relationships in the social sciences can be approximated reasonably well with straight lines (Blalock, 1960) and we presume the association between planned time allocations and actual time allocations is no exception. Finally, there is no theoretical model describing the relationship between planned and actual time allocations; in the absence of such a model, we used a linear model as a first approximation.

Assuming that a linear relationship does exist, the next question of interest becomes, what is the nature of the relationship? The first step in the investigation of this question was to determine possible theoretical models between variables x and y.

The statistical model we used is the simple linear regression model of y on x, and is given as follows:

$Y_i = \beta_0 + \beta_1 X_1 + \varepsilon_i$ [i = 1, 2, ..., n) where

Y_i is the predicted (actual) time allocation in the ith observation

X_i is the planned time allocation in the ith observation

β_0 is a population parameter, the intercept of the regression line

β_1 is a population parameter, the slope of the regression line

ε_i are uncorrelated error random variables with mean 0 and unknown variance

In many theoretical models, we would not make an allowance for error; but because we believe the planning process to be stochastic and not constant over time for a teacher, we include the error term.

We believe theoretical linear relationships specified by this mathematical model will provide the basis for understanding actual relationships described in Chapter 6.

The nature of each theoretical linear relationship can be understood by examining the regression coefficients, β_0 and β_1, and the regression line which graphically depicts it. For this study, β_1, the slope of the regression line, is defined as the average change in actual time allocation Y for a one-unit change in planned time allocation X; it provides a measure of how closely actual time allocations parallel planned time allocations. If no parallel exists, then $\beta_1 = 0$. On the other hand, if $\beta_1 \neq 0$, then we presume a linear relationship exists.

The intercept, β_0 is the point where the regression line intercepts the Y axis; it provides information about a teacher's unplanned use of time.

Table 4.1 displays all possible combinations of regression coefficients for the linear model. We believe each combination reflects a unique theoretical model that may be able to represent a teacher's time decision pattern. In the next section, we will discuss the general time decision pattern suggested by the slope and intercept of each model.

Theoretical Models

Two different kinds of theoretical models are shown in the Table. One kind suggests teacher time decision patterns which are not likely to be followed by teachers; we believe then that these models are not representative of reality. Models of this kind are identified in Table 4.1 by Roman numerals.

The other kind of model may reflect time decision patterns of practicing teachers. Models of this kind are identified in Table 4.1 by Arabic numerals.

Theoretical Models Not Representative of Reality

A theoretical model was judged to be not representative of reality if it suggested one or more of the following situations:

(1) its regression line predicts most dependent variables to be 0;

(2) its regression line predicts at least one dependent variable to be less than zero; or

(3) its regression line suggests a totally irrational decision making pattern for allocation and use of time.

Models which predict most values of y to be 0 or any value of y to be negative. The dependent variable y used in this study was a continuous time variable; it was the time in minutes during which an activity (whether planned or unplanned) was observed. In this study, the value of the dependent variable y was determined by counting the number of minutes which elapsed between the starting time of an observed activity

Table 4.1

Possible Theoretical Linear Models of Teacher Time Decision Patterns

β_1 \ β_0	< 0	= 0	> 0
> 1	I	1	2
= 1	II	3	4
> 0 < 1	III	5	6
= 0	IV	VI	VIII
< 0	V	VII	IX

and its ending time. Thus, if an activity occurred, i.e., had a starting and ending time, its time y was positive since time progresses in only one direction, forward or a positive direction. The greater the difference between the starting and ending time of an activity then, the greater the positive value of y was. Because either planned or unplanned activities will occur when school is in session, the value of most or all y's would be positive. It is possible, however, that in some cases the value of y would be 0. This situation would happen only if a planned activity x did not occur, i.e., it did not have a starting time. We don't believe, however, that it is possible for most or all y's to be zero since this would indicate that few or no planned activities occurred. Such a practice seems highly unlikely because it suggests that a teacher either did not plan or that (s)he did not provide time for any of his/her planned activities.

There are no natural classroom situations for which a negative value can be computed for y, i.e., a negative y intercept; such a value implies negative time which is logically non-existent.

Thus, for a theoretical model to be representative of a teacher's typical time decision pattern over a fully day or multiple days, it must predict all values of y to be positive; it may predict some values of y to be zero, but none to be less than zero.

Theoretical Models I-VII do not conform to these standards. In Figure 4.1, regression lines suggested by these models are shown. These regression lines make it clear that all the models except Model VI predict negative values of y. The regression line for Model VI indicates that all values of y are zero. As previously stated, a negative value of y is logically non-existent and further, it is highly unlikely that all values of y would be zero. We conclude, therefore, that Models I-VII cannot represent the typical time decision patterns of a practicing teacher.

If we assume, however, that the relationship between x and y is not linear in the extremes, but exhibits an asymptote, then altering the curves of Models I, II, and III asymptotically creates theoretical models which may reasonably represent an actual relationship between x and y since they do not suggest zero or negative values for y. Theoretical regression lines for asymptotic models of Models I, II, and III are shown in Figure 4.2. We labeled these asymptotic models 2A, 4A and 6A because they are, in many ways, similar to Models 2, 4 and 6.

Asymptotic relationships are represented by a straight line which bends in toward the origin as it approaches the x-axis. The line will never intersect the x-axis nor will it pass through the origin; instead, the regression line of an asymptotic relationship will intersect y-axis at a point greater than zero. The nature of the relationships suggested by Models 2A, 4A and 6A will be discussed later in this chapter.

Models which imply irrational time decision behavior. One would expect a teacher's actual time allocations to be at the very least minimally guided by his/her planned time allocation. It is not logical that (s)he would invest time and effort in a plan and then consistently allocate time in the classroom in a way that did not resemble in any way what (s)he had planned. Of course, events in the classroom probably necessitate some alterations in a teacher's planned time allocations from time to time, so (s)he may not always follow his/her plan

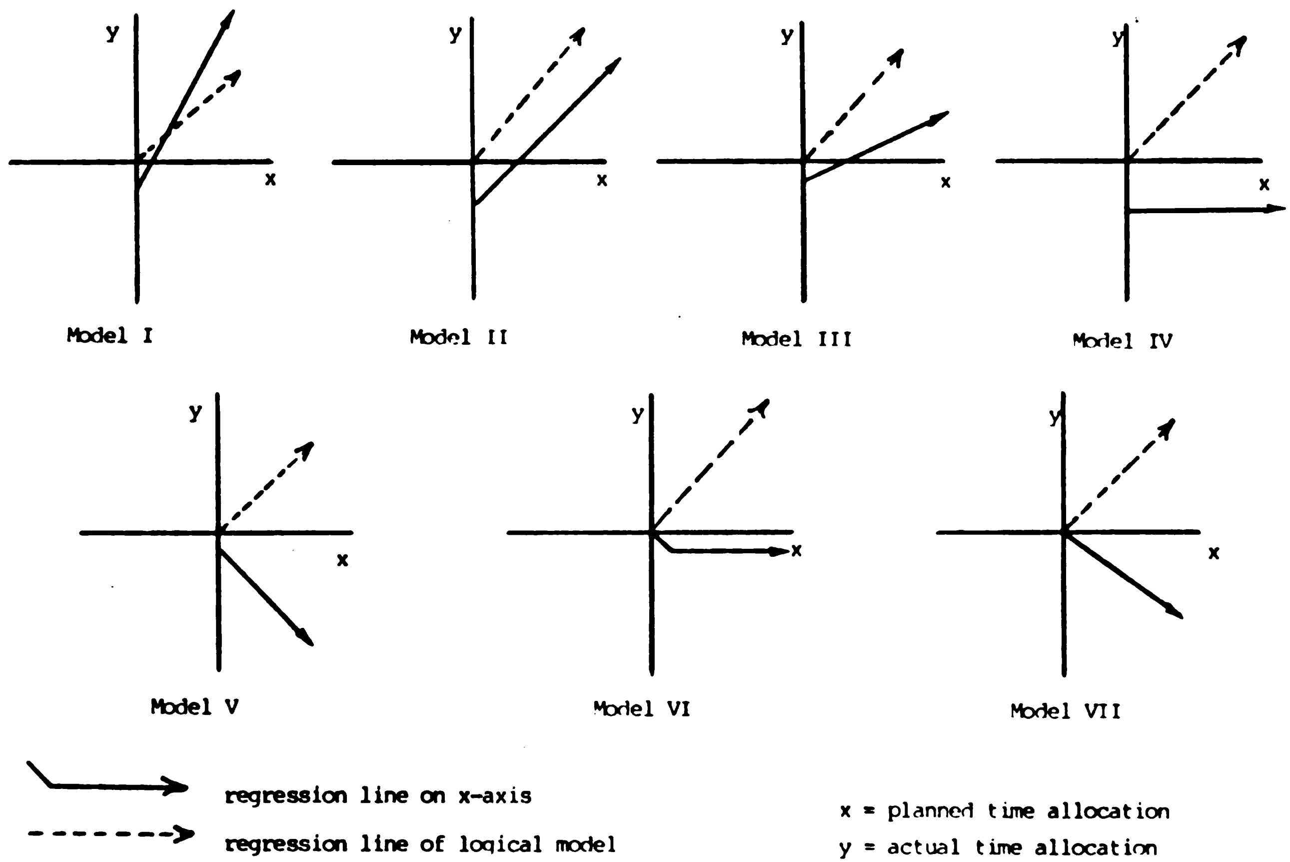
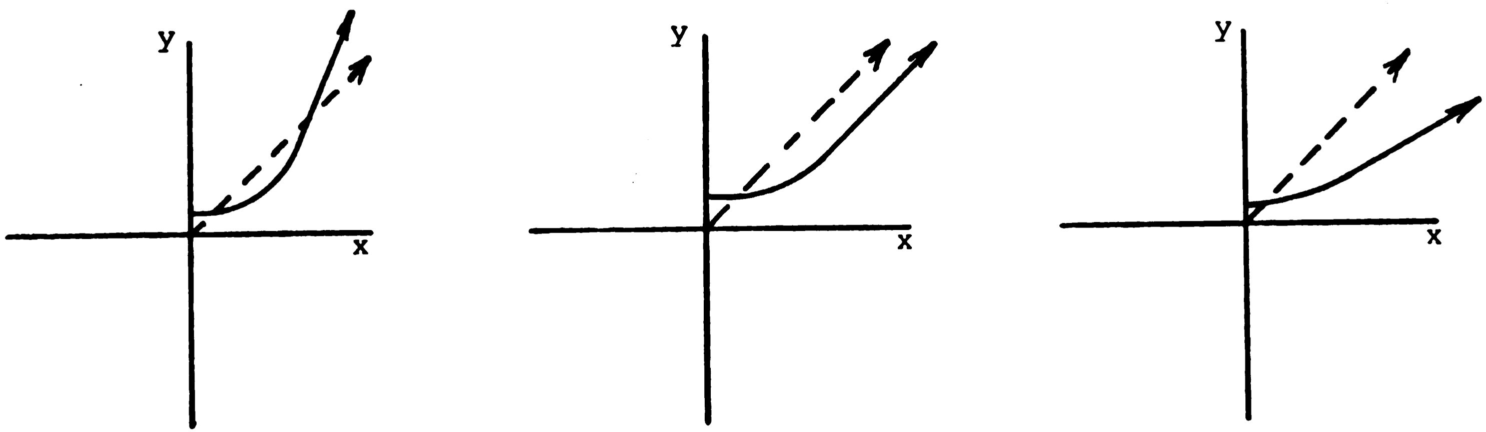


Figure 4.1

Regression Lines Summarizing Theoretical Models I - VII



Model 2A Model 4A Model 6A

- - - - - - - -> regression line of logical model

x = planned time allocation

y = actual time allocation

Figure 4.2

Regression Lines Summarizing Theoretical Asymptotic Models 2A, 4A and 6A exactly. But in general, a teacher's use of time in the classroom ought to be similar to his/her planned use of time. Any theoretical model then which suggests a time decision pattern which does not conform to this rational approach is not considered to be representative of time decision patterns of practicing teachers.

Theoretical Models VIII and IX suggest irrational time decision patterns. Regression lines suggested by these theoretical models are graphically displayed in Figure 4.3. The regression line of Model VIII suggests that actual time allocations differ widely and unsystematically from planned time allocations: the planned length of some activities is short but their actual length is very long and vice versa while the planned and actual length of other activities are quite similar. In other words, Model VIII indicates a time decision pattern in which the time provided for classroom activities apparently has nothing to do with how much time was allocated to them in the plan. Differences between a teacher's planned and actual time allocations are to be expected; it is highly unlikely though that a teacher's planned and actual time allocations would differ in such an unsystematic manner. For this reason, we do not believe Model VIII is representative of time decision patterns of practicing teachers; in fact, if a teacher is not systematic in the allocation of time in the classroom, (s)he probably would not plan rather than plan and then act randomly in the allocation of time in the classroom.

The time decision pattern which we infer from the regression line suggested by Model IX is equally unreasonable. Model IX suggests that a teacher consistently provides the most time for activities with the shortest planned time allocations and the least time to activities with

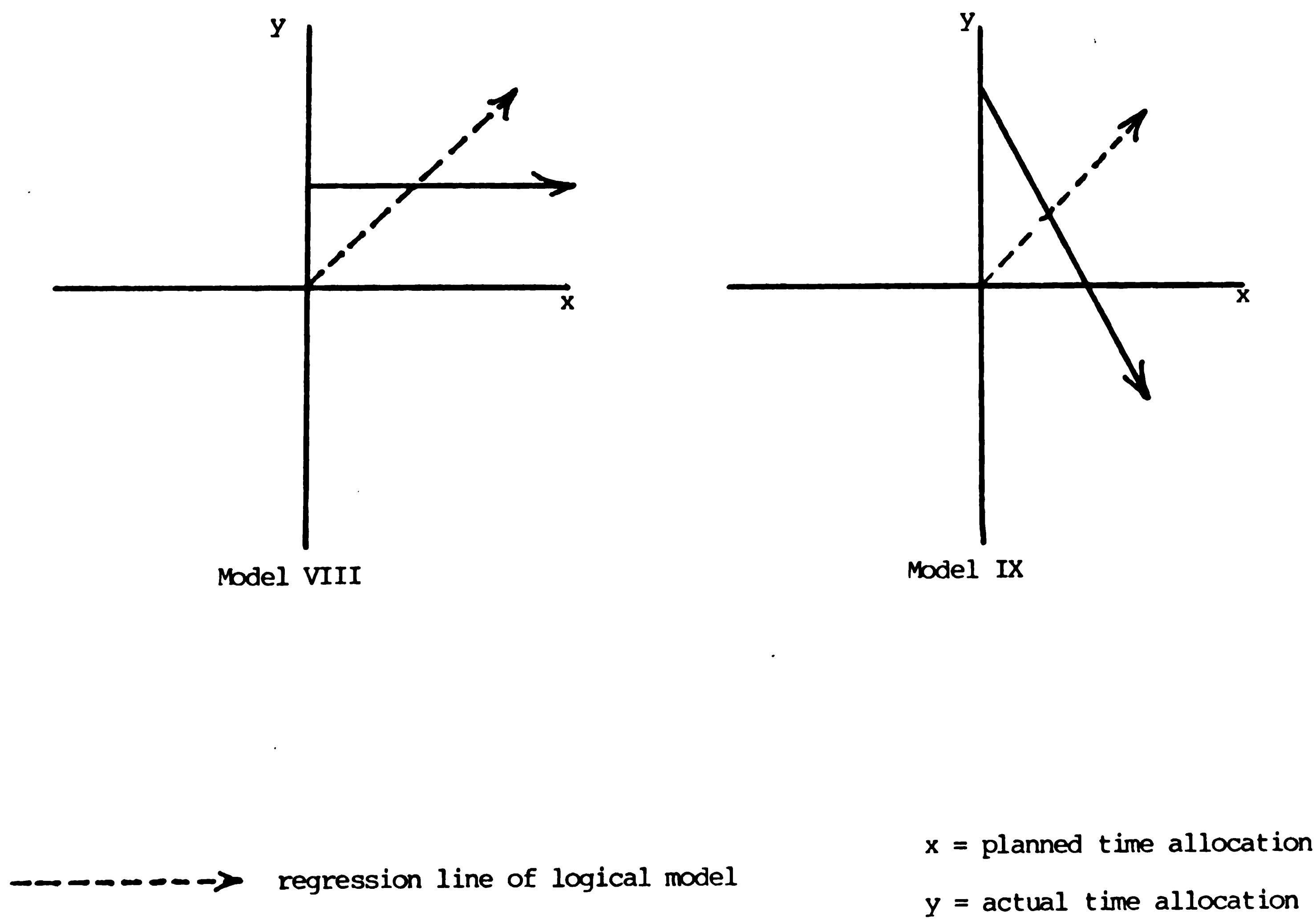


Figure 4.3

Regression Lines Summarizing Theoretical Models VIII and IX the longest planned time allocations; this would be a complete reversal of his/her planned time priorities. Such a time decision pattern seems totally unreasonable; therefore, we believe Model IX does not represent the time decision pattern of practicing teachers.

Theoretical Models Which Represent Reality

We believe that a teacher's typical time decision pattern may be represented by one of the models which are numbered 1-6 in Table 4.1.

Model 3 represents a time decision pattern of the teacher who does not systematically modify his/her planned time allocations; instead, the amount of time (s)he provides for planned activities is on the average exactly as (s)he had planned. Deviations from the plan may occur, but the deviations would vary randomly. Such a time decision pattern is defined as the Logical Model.

When a teacher does not follow his/her time allocations perfectly on the average, then his/her time decision pattern will be different from the logical time decision pattern. We believe that Models 1, 2, 2A, 4, 4A, 5, 6, and 6A are the only models which may represent time decision patterns which occur as a consequence of a teacher departing in a non-random or systematic fashion from what (s)he had planned.

Of these nine models, six of them appear to be appropriate for representing a teacher's typical time decision pattern over a full day or multiple days; the other models may only represent a teacher's typical time decision pattern over a part of a day or days.

In order for a model to represent a teacher's time decision pattern over a full day or multiple days, it must show that either $\varepsilon y = \varepsilon x$ or that $\varepsilon y > \varepsilon x$. The term εx is defined as the total amount of time a teacher allocates (planned time allocations) to planned activities for the day; it can never be greater, but it could be less than the available school time. The term εy is defined as the total amount of time a teacher actually provides (actual time allocations) for activities. Since the total available school time was considered for each day observed in the present study, εy must always equal all the available school time if a model is to be representative of actual practice. Therefore, any model which shows that $\varepsilon y = \varepsilon x$ is assumed to represent the time decision pattern of a teacher who allocates all of the available school time.

If a teacher allocates less than the available school time, then the model which represents his/her time decision pattern shows that $\varepsilon y > \varepsilon x$; εy equals all the available school time while εx is less than the available school time.

A model that shows that $\varepsilon y < \varepsilon x$ indicates that a teacher provides less time than what (s)he had allocated in his/her plans. It is reasonable to assume that the most time a teacher would allocate in his/her plans would be the available school time. Given this assumption then, a model that shows the time actually provided to be less than the planned time does not account for all of the available school time. Therefore, such a model cannot represent a teacher's time decision pattern over a full day or days.

A teacher may, however, provide less time than (s)he had planned to some planned activity (assuming of course that the activity was not planned to last the full day). In this case then, a model which showed $\varepsilon y < \varepsilon x$ could represent his/her time decision pattern over the part of the day during which the activity occurred.

None of the time decision patterns indicated by theoretical

Models 1-6, 2A, 4A and 6A is thought to reflect random or unsystematic time decisions by a teacher to depart from his/her plans. Instead, each model is thought to represent a systematic time decision pattern by which a teacher typically modifies his/her planned time allocations. We call this practice plan modification.

Plan modification occurs after a teacher's written plans have been completed. Plan modification is defined as a teacher practice in which (s)he alters the length of planned time allocations. As a result of this practice, planned activities which do occur will last either a longer or shorter length of time than planned. Sometimes though, plan modification results in unplanned activities occurring (planned time allocations increased from zero) or planned activities being eliminated (planned time allocations decreased to zero).

We believe there are three basic plan modification patterns. These patterns are: (1) proportional modification; (2) constant modification; and (3) constant/proportional modification. Each theoretical model (Models 1, 2, 2A, 3, 4, 4A, 5, 6 and 6A) represents a time decision pattern which occurs when a teacher modifies his/her planned time allocations in a variation of one of these three ways. Each time decision pattern characterizes typical behavior for the teacher who practices it.

In the following sections of this chapter, we will discuss these theoretical models. First we will discuss the time decision pattern represented by Model 3, the Logical Model. Then we will discuss each of the other theoretical models. The discussion will be organized as follows: first Proportional Models will be discussed, then Constant Models, then finally, Constant/Proportional Models. As part of our discussion, we will illustrate the models with a regression line which best typifies each one.

When discussing each, we assume that a teacher allocates most but not all of the available school time to planned activities. This assumption is supported by the data we will present in the next chapter which shows that teachers in this study left a part of the available school time unallocated in their plans.

Logical Model. The Logical Model represents a time decision pattern in which the available school time is used on the average exactly as planned. The regression line for this model is shown in Figure 4.4. Planned time allocations in the Logical Model are not systematically modified; they may, however, be modifed randomly. Since modifications are thought to be random, we assume they would cancel each other out, thus resulting in the regression values of Model 3.

This phenomenon can be demonstrated by an example. We will use Figure 4.4 to illustrate it. For this example, line (A) represents the regression line of the Logical Model. Broken lines (B) and (C) indicate average lengths of activities after their planned time allocations were randomly modified. As can be seen, activities indicated by line (B) ended up being longer on the average than planned, while activities indicated by line (C) ended up being shorter on the average than planned. But, taken together or averaged out, these modifications cancelled each other out resulting in the Model 3 relationship represented by regression line (A).

If the modifications are not random, then they will not cancel each other out. Thus planned time allocations will on the average be longer or shorter than planned. When non-random modifications occur,

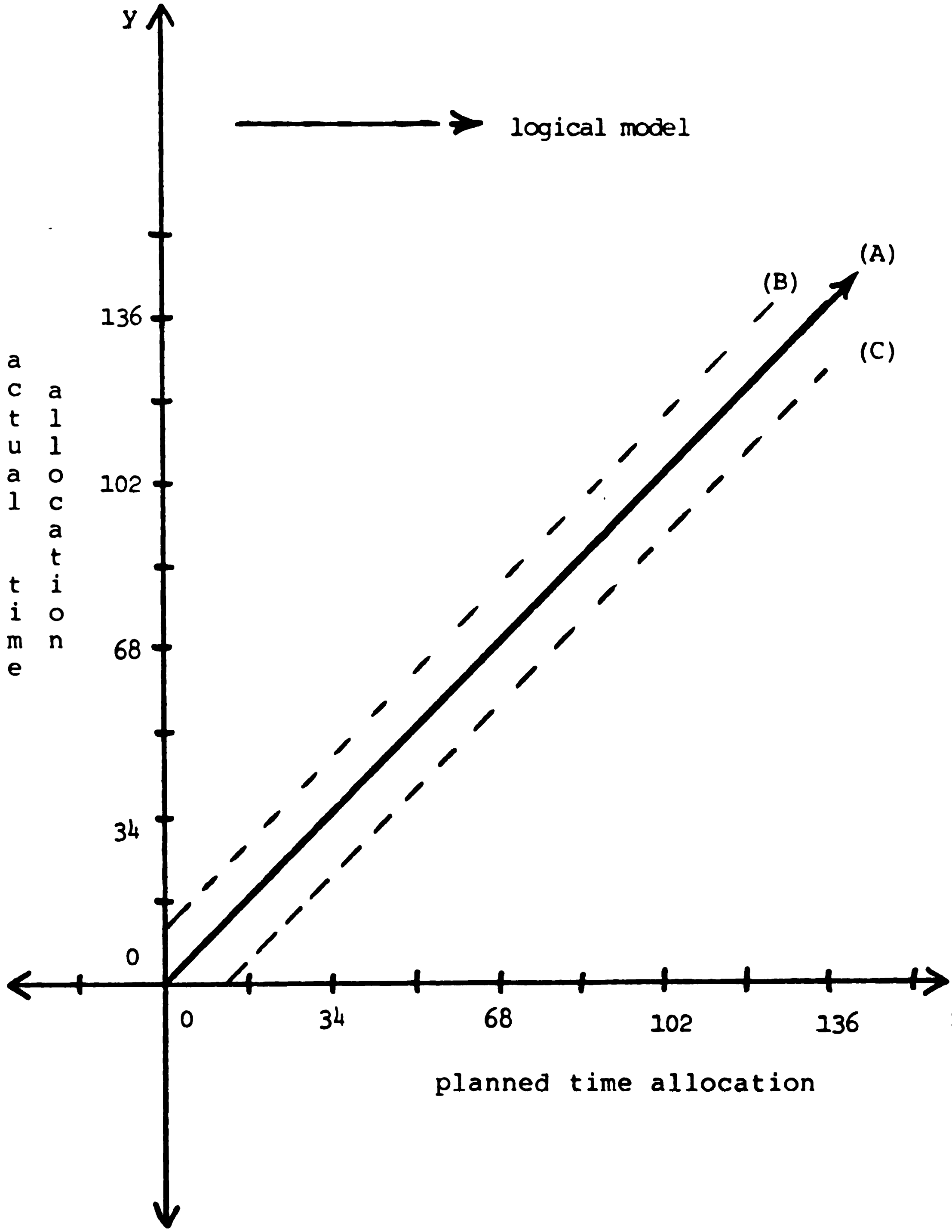


Figure 4.4

Regression Line Summarizing Theoretical Model 3 - Logical Model a relationship other than the logical one will result.

A teacher whose planned time allocations are on the average the same as his/her actual time allocations is an accurate planner; (s)he accurately predicts how time will be used in the classroom. While it may be possible for a teacher to be an accurate planner, in practice it seems highly unlikely. Classroom events are too unpredictable. Further, it would seem that teacher characteristics, the complexity of school, the classroom milieu and the diversity of students would create many occasions for systematic plan modifications.

For these reasons, we believe Model 3 is not likely to reflect a practicing teacher's typical time decision pattern, although it could, especially given random modifications. We believe that it is more likely, however, that Theoretical Models 1, 2, 2A, 4, 4A, 5, 6 and 6A represent practicing teachers' typical time decision patterns since these models reflect systematic teacher behavior.

The systematic nature of these models does not preclude random deviations from a teacher's typical time decision pattern. In fact, random deviations are anticipated because the planning model is stochistic; but, over a day and over multiple days, we expect a teacher's time decision pattern to be similar to one of the patterns represented by these eight models.

Time decision patterns represented by these models and the plan modification patterns thought responsible for each of them will be discussed below.

Proportional models. The primary teacher behavior suggested by proportional models is the systematic modification of planned time allocations by some percentage or proportion. A characteristic feature of proportional modification then, is that planned activities with shorter time allocations are modified to a lesser extent than planned activities with longer time allocations. The following example illustrates this characteristic of proportional models. Suppose a teacher systematically increases his/her planned time allocation by ten percent. Activities planned to last twenty minutes then may actually last on the average twenty-two minutes while activities planned to last fifty minutes may actually last on the average fifty-five minutes. In this example of plan modification, the lengths of the shorter activities are typically increased two minutes while the lengths of the longer activities are increased five minutes. A similar phenomenon would occur if a teacher systematically decreased his/her planned time allocations proportionally. In the proportional time decision pattern, time is not provided for unplanned activities. It is possible, however, in the proportional time decision pattern for planned activities to be eliminated. Support for these assumptions will be presented in discussions of the specific models.

In proportional plan modification, it seems that planned time allocations only need to be fine-tuned rather than modified extensively, a teacher behavior similar to that of the "comprehensive planner" reported by Clark and Yinger (1979).

There are two models which represent proportional modification. One is the Proportional Increase Model and the other is the Proportional Decrease Model. The time decision patterns represented by these models are discussed below.

One model resulting from the proportional plan modification is Model 1; we call it the Proportional Increase Model. The regression line for it is shown in Figure 4.5.

The Proportional Increase Model represents the time decision pattern of the teacher who proportionally increases planned time allocations. We would not expect teachers who modify their planned time allocations in this way to provide time for unplanned activities; to do so would limit the amount of time available to increase the lengths of planned time allocations. Further, the use of unplanned activities would increase the value of β_o above zero. Since β_o is zero in this model, unplanned activities could not occur.

The practice of providing more time for activities than was planned indicates that the teacher who uses the proportional increase time decision pattern underestimates in the planning stage how much time activities really need. A teacher who plans in this way is an "underestimator planner" or simply an underplanner.

Underplanning creates a time problem for the teacher: (s)he must somehow obtain time to increase the lengths of actvities beyond what had been planned and yet stay within the time constraints of the school day. The only way a teacher can resolve this dilemma is to anticipate the need for additional time and plan accordingly. With this method, the underplanner will leave some of the available school time unallocated in his/her plan. (S)he then parcels the unallocated time out in varying amounts to planned activities which (s)he decides need more time. Clark and Yinger's (1979) "incremental planner" may be an example of a teacher who practices this time decision behavior.

It would seem that the underplanner could obtain extra time by decreasing the planned time allocations of some planned activities. This strategy, however, would result in a decrease in the value of β_1

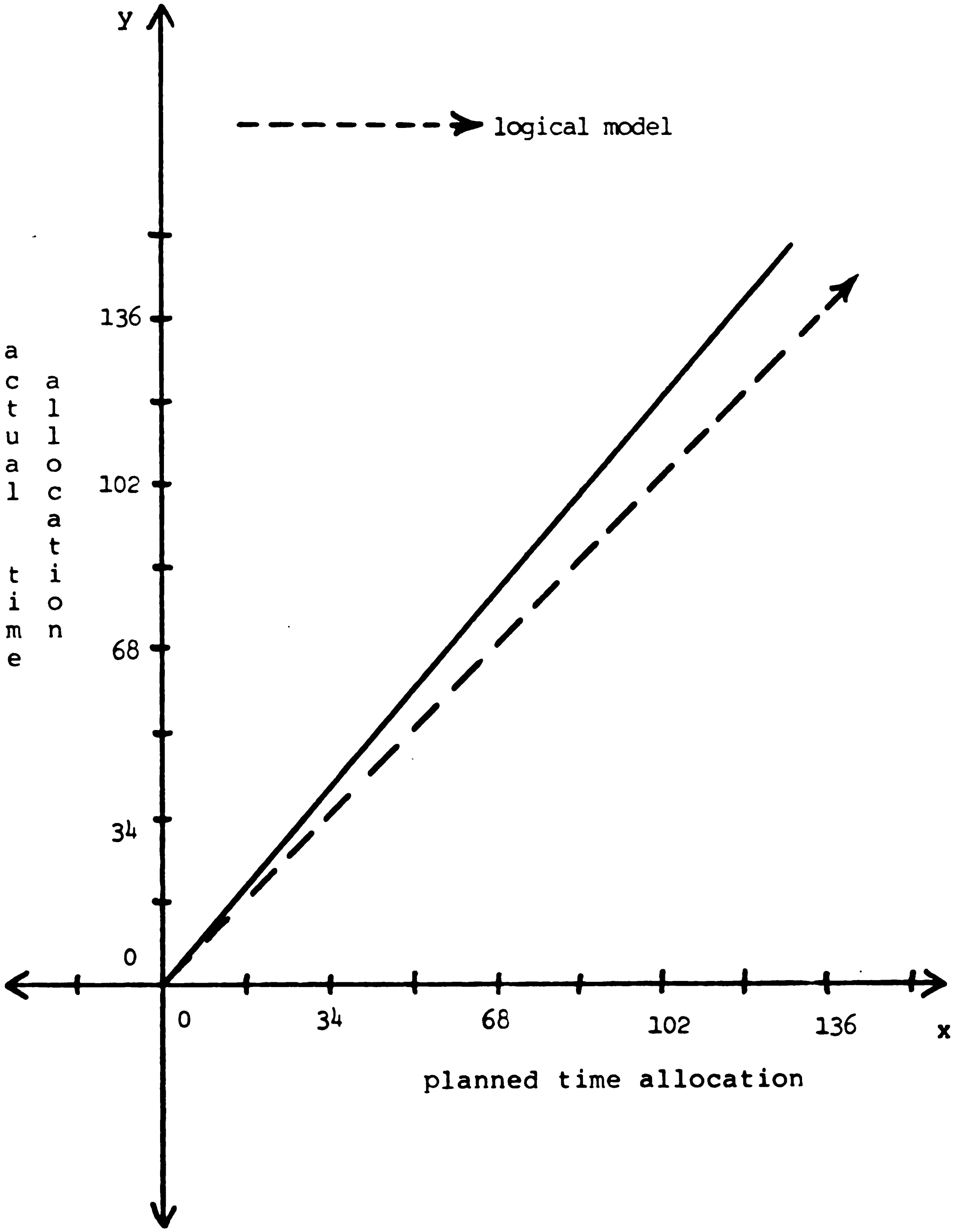


Figure 4.5

Regression Line Summarizing Theoretical Model 1 - Proportional Increase Model below one. Since the value of β_1 in the Proportional Increase Model is greater than one, plan changes of this sort will typically not be made by the underplanner.

A logical source of extra time is the extention of the school day beyond its normal ending time. We assume, however, that a teacher is only able to use the available school time which is established by the school district; so, lengthening the school day is not an option for obtaining extra time to increase planned time allocations.

The extent to which the Proportional Increase Model varies from the Logical Model, i.e., how much greater β_1 is than one, depends on how much time the underplanner leaves unallocated in his/her plans. If (s)he leaves substantial amounts of time unallocated, then those activities which are planned could be lengthened by quite a large amount. A teacher time decision pattern of this sort would result in a Model 1 whose β_1 is considerably larger than one.

On the other hand, if the underplanner leaves a small amount of time unallocated, then planned activities can be lengthened by only a small amount. This time decision pattern results in a Model 1 which has a β_1 just slightly larger than one.

The second model resulting from proportional plan modification is Model 5. The regression line for Model 5 is shown in Figure 4.6. Model 5 is called the Proportional Decrease Model because it represents the time decision pattern of the teacher who systematically decreases planned time allocations by some percentage.

Modifying planned time allocations in this way indicates that the teacher overestimates in his/her plans how much time classroom activities will actually need. A teacher who demonstrates this planning

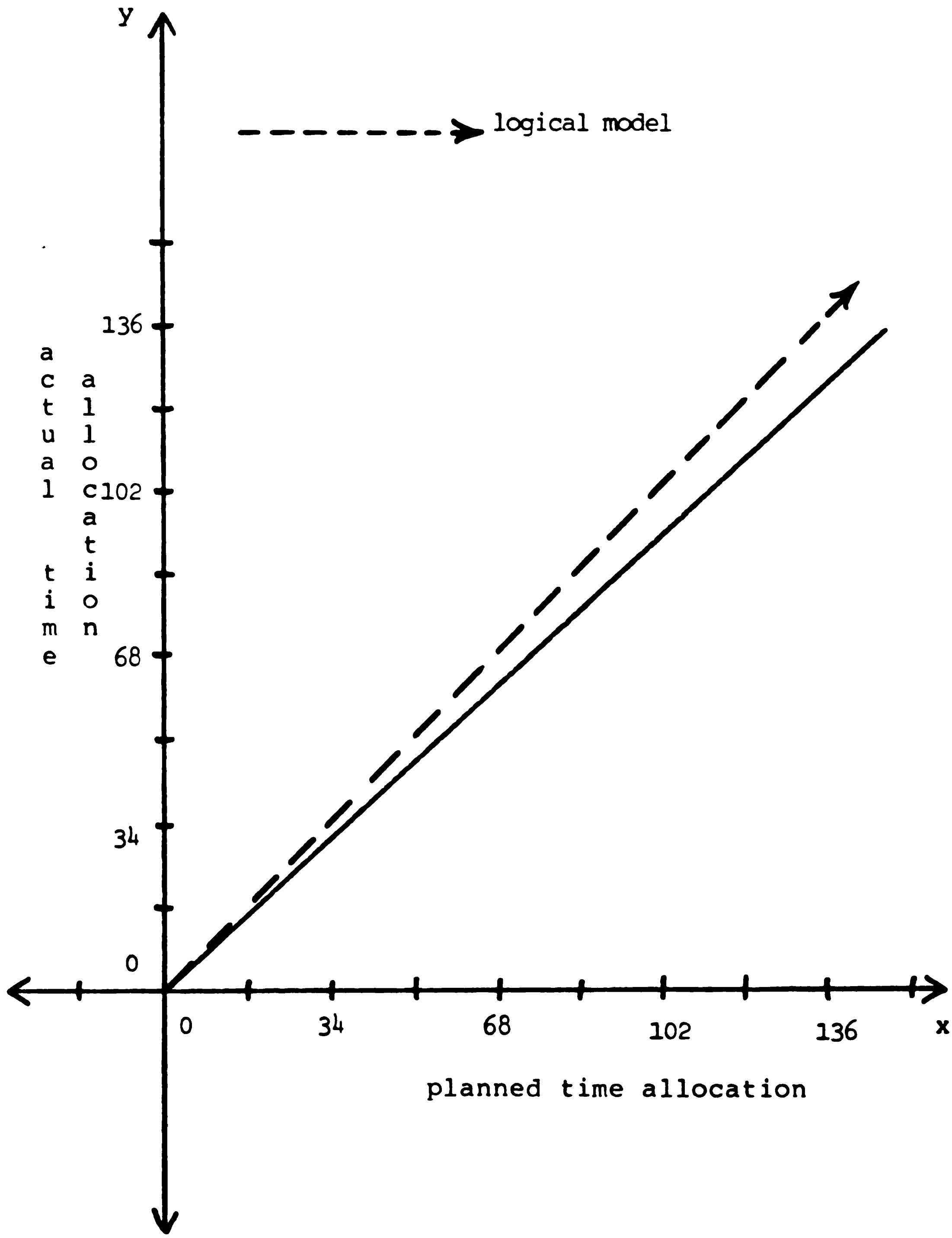


Figure 4.6

Regression Line Summarizing Theoretical Model 5 - Proportional Decrease Model behavior is an "overestimator planner" or simply an overplanner. As a result of overplanning, it becomes necessary for the teacher to shorten classroom activities, i.e. provide less time to activities than (s)he had planned.

Since the Proportional Decrease Model suggests that planned time allocations are shortened by a small percentage, it seems likely that a teacher who practices this plan modification pattern would provide some time in the classroom for all planned activities. In other words, in a proportional time decision pattern, all planned activities would be expected to receive a proportion of the time allocated to them. This implies, however, that teachers would modify all planned time allocations in the same manner. Such a practice is not characteristic of teacher behavior. Therefore, deviations from the proportional time decision pattern are to be expected. Deviations in the way planned time allocations are modified then could result in planned activities being eliminated.

We believe, however, that Model 5 does not represent a teacher's time decision pattern over a full day or multiple days. We are led to this conclusion because the regression line of Model 5 indicates that $\varepsilon y < \varepsilon x$, a situation which exists only when less than the available school time is accounted for.

What Model 5 is thought to represent then is a teacher's time decision pattern over a part of a day or parts of days. With this in mind, the model is interpreted to show that on the average a teacher typically provided less time for a subset of the planned activities than was allocated to them in the plan. For example, the model may describe a teacher time decision pattern for a single content area, e.g. Reading.

Constant models. The distinguishing characteristic of constant models is that planned time allocations are shown to be modified by the same (constant) amount of time. Because every planned activity is modified on the average the same amount of time without regard to its planned length, the percent of change in time for shorter activities is much greater than for longer activities. For example, systematically adding two minutes to planned activities with ten minute planned time allocations is a twenty percent increase in time, while systematically adding two minutes to planned activities with forty minute planned time allocations is only a five percent increase in time.

There are two models which represent constant modification. One is the Constant Increase Model and the other is the Constant Decrease Model. The time decision patterns represented by these models are discussed below.

One model resulting from constant plan modification is Model 4, the Constant Increase Model. A regression line for this model is shown in Figure 4.7.

Model 4 results when a teacher systematically provides on the average exactly the same amount of time for activities as (s)he allocated in his/her plan, plus a constant amount of extra time.

In one sense then, a teacher who behaves in this way is an accurate planner; (s)he accurately anticipates how much time activities will need in the classroom. In another sense though, (s)he is not an accurate planner because (s)he fails to take into account in his/her plans that a constant amount of extra time will later be added to each activity. For this reason, we call a teacher who underestimates in

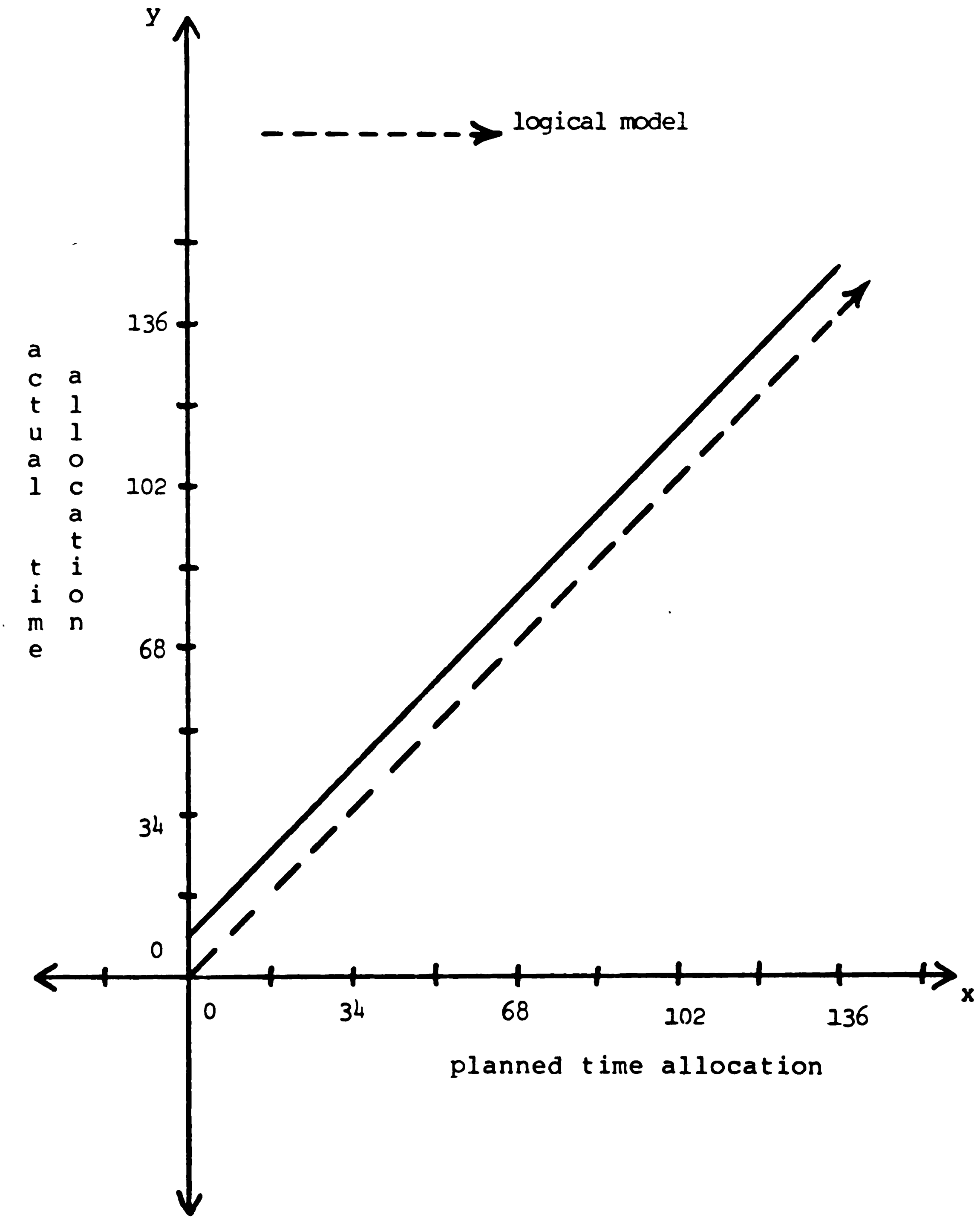


Figure 4.7

Regression Line Summarizing Theoretical Model 4 - Constant Increase Model this way a constant underplanner.

Since Model 4 indicates that on the average, planned time allocations are lengthened, the model cannot be used to represent the time decision pattern over a full day or multiple days of any teacher who allocates all of the available school time. The model in this case would indicate that the teacher used more than the available school time. This condition cannot exist in our study because only the available school time was accounted for, not the time before or after school.

But, if a teacher allocates less than the available school time, then Model 4 may describe his/her time decision pattern over a full or multiple days. It would not be necessary in this case for the teacher to shorten any planned time allocations; (s)he could obtain time to constantly increase planned time allocations from unallocated time.

Model 4 may also represent a teacher's time decision pattern over only a part of a school day. The model in this case suggests that a teacher constantly increases the planned time allocations of a subset of planned activities. How a teacher obtains the time to do this is not explained by the model; in fact, when only a part of the school day is considered, it is not necessary for the model to account for all of the available school time.

Why does the constant underplanner increase planned activities by a constant amount of time? It doesn't seem reasonable that (s)he would need the same amount of extra time for every activity; rather (s)he would more likely need differing amounts of extra time for each activity because the degree of difficulty as well as student aptitudes and responses for different activities vary considerably. Therefore, we believe the constant underplanner does not use the extra time for the planned activities as such, but for activities which occur in conjunction with a planned activity, i.e. accessory activities. We define accessory activities as introductory or closing activities such as announcements relating to the planned activity, collecting papers, and making assignments. Such tasks are a necessary part of every planned activity; a teacher would find it very difficult to conduct classroom activities without them because they facilitate instruction and management.

Accessory activities probably require about the same amount of time, say two-five minutes, no matter how long the planned time allocation is. Adding accessory activities to planned activities then would explain why all planned time allocations are increased by roughly the same amount of time.

We would expect a teacher's planned time allocations to take into account both the time needs of planned activities and accessory activities. The constant underplanner may, however, fail to allocate sufficient time so that accessory activities may occur. If this is the case, then (s)he would need to extend planned allocations by a constant amount of time in order to have time to complete both planned and accessory activities.

A model which represents a time decision pattern of the teacher who decreases on the average each planned time allocation by the same amount of time is the <u>Constant Decrease Model</u>. A regression line for this model would be similar to that of Model II (see Figure 4.1). Model II is not logically possible though because the intercept of its regression line is negative, a situation which indicates the existence of negative time.

How then can the constant decrease time decision pattern be represented? If we assume that the constant decrease time decision pattern is non-linear, then Model 4A may represent it. Model 4A is shown in Figure 4.8. The regression line for Model 4A becomes asymptotic to the x-axis and intersects the y-axis at a point greater than zero.

This Asymptotic Model suggests that in a constant decrease time decision pattern, all but the very shortest planned time allocations are shortened by some constant. As a consequence, excess time becomes available which can be used in ways not anticipated by the plan. The regression line of Model 4A indicates that some excess time is used to increase, by a small amount of time, a few of the shorter planned time allocations. It also indicates that some unplanned activities are provided time. These practices appear to be an essential part of a Model 4A time decision pattern.

The regression line seems to indicate that $\varepsilon y < \varepsilon x$; so evidently, a constant decrease time decision pattern does not make use of all the excess time generated by constantly decreasing planned time allocations. But, it is not clear from the model how a teacher who demonstrates a Model 4A time decision pattern makes use of excess time.

Since Model 4A does not account for all of the available school time, we believe it represents a teacher's time decision pattern over only a part of a day or days.

Constant Proportional Models. Teachers may systematically modify their planned time allocations in a constant and proportional way. There are four different models which depict the time decision pattern of the teacher who modifies his/her plans in this way. They are the

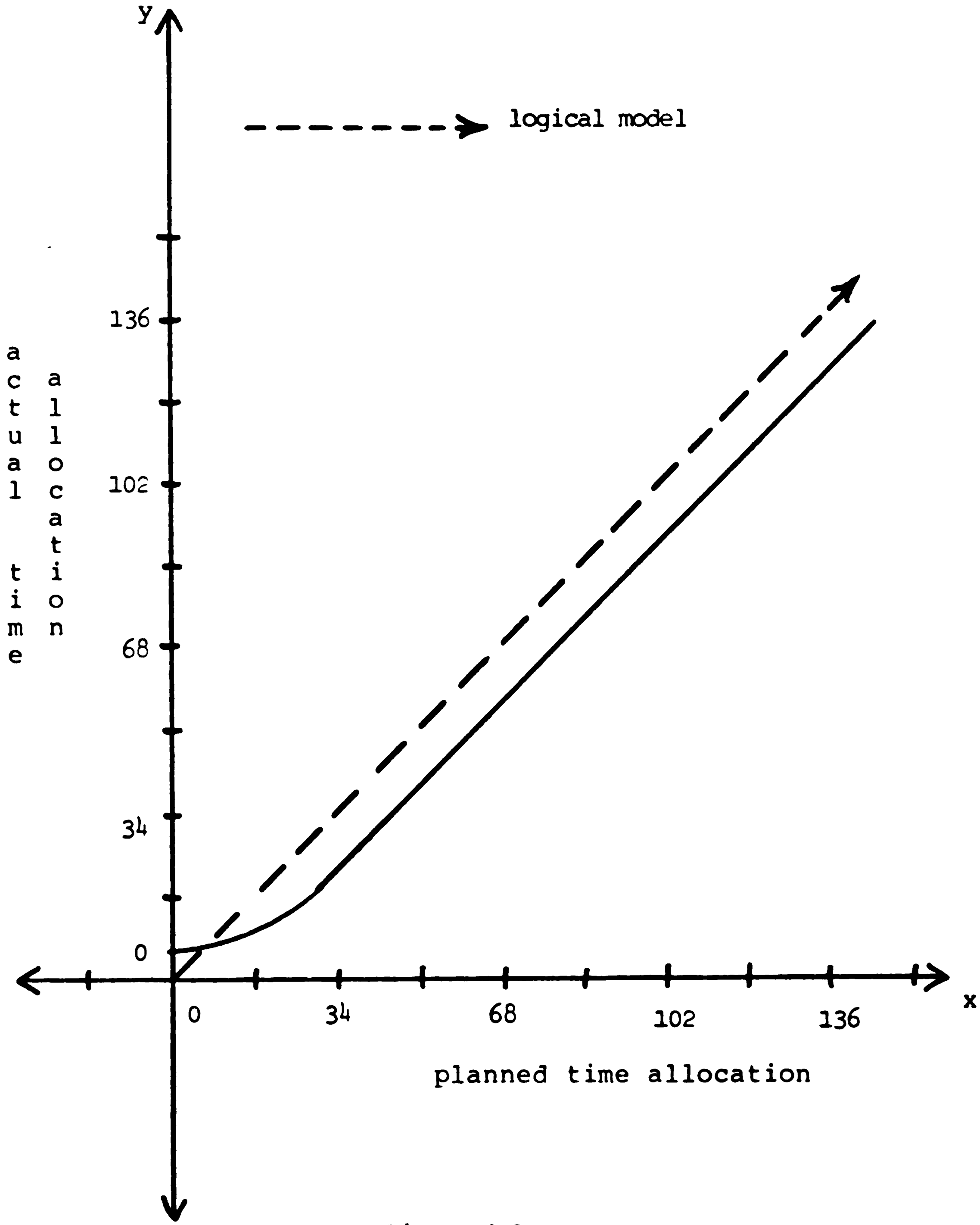


Figure 4.8

Regression Line Summarizing Theoretical Model 4A - Asymptotic Constant Decrease Model

Constant/Proportional Increase Model, the Constant/Proportional Decrease Model, the Constant Increase/Proportional Decrease Model, and the Constant Decrease/Proportional Increase Model.

One model which summarizes a constant proportional time decision pattern is Model 2. This model represents the time decision pattern of a teacher who systematically modifies his/her planned time allocations by increasing them by a constant and a proportional amount of time. On the average then, this time decision pattern results in planned activities lasting longer than planned. The regression line for the constant/proportional increase time decision pattern is displayed in Figure 4.9.

Since the slope of the regression line is greater than one, this suggests that in a constant/proportional increase time decision pattern a teacher does not on the average decrease or eliminate any planned time allocations. But, since the intercept is greater than zero, it is believed (s)he provides time for unplanned activities.

The teacher who modifies his/her planned time allocations in this way evidently did not estimate correctly the time needs of accessory and planned activities nor did (s)he accurately plan what activities would occur. Such a teacher can be described as a constant/proportional underplanner.

The logical source from which the constant/proportional underplanner can obtain time for unplanned activities and to extend the lengths of planned activities is from unallocated time. We assume this because the slope of the model is greater than one indicating that planned time allocations in general are not shortened.

Model 2, like Model 4A, cannot represent the time decision pattern

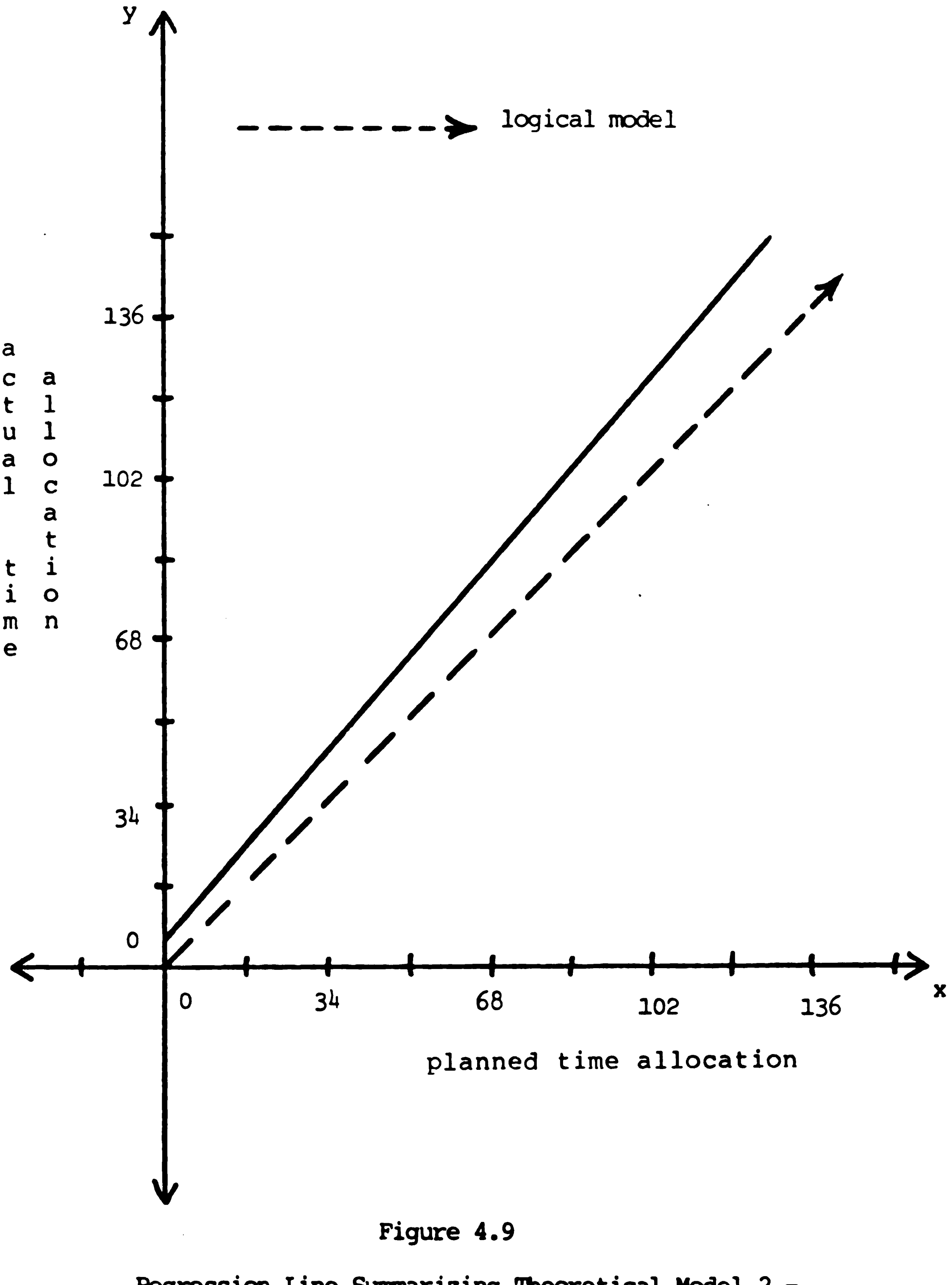


Figure 4.9

Regression Line Summarizing Theoretical Model 2 -
Constant/Proportional Increase Model

of a teacher who allocates all of the available school time because ϵy for such a teacher would be greater than the available school time. Model 2 may, however, represent the time decision pattern over a full day or multiple days of a teacher who leaves some of the available school time unallocated in his/her plans. It may also represent a teacher's time decision pattern over a part of a day or days.

A Constant/Proportional Decrease Model summarizes the time decision pattern of a teacher who consistently decreases planned time allocations by a constant and proportional amount of time. As a result of this modification practice, the lengths of all planned activities are shortened; but, planned time allocations of different lengths are shortened by different percentages. The pattern of decrease is as follows: the longer the planned time allocations, the smaller the percentage by which it is decreased; and, the shorter the planned time allocation, the greater the percentage by which it is decreased.

Even though the percentage of decrease gets smaller as planned time allocations become longer, longer planned time allocations are shortened by a greater amount of time than the shorter planned time allocations.

This time decision pattern may be the outcome of overplanning, i.e., allocating more time to planned activities than the activities actually need. As a consequence, the teacher modifies the lengths of the planned time allocations to conform to the actual time needs of the activity.

In many respects, this time decision pattern can be summarized by Model III shown in Figure 4.1. The regression line for Model III indicates, however, the existence of negative time, something that is not logically possible. Therefore, as before, we reject Model III as not representative of reality. Perhaps a Model III regression line, rather than intersecting the y-axis at a point less than zero, asymptotes and intersects the y-axis at a point greater than zero. Such an alteration of Model III results in a non-linear model. A regression line for this asymptotic model, Model 6A, is shown in Figure 4.10. This model appears to accurately represent the constant/proportional decrease time decision pattern.

The positive intersection of the regression line with the y-axis indicates that in a Model 6A time decision pattern, a very small amount of time is added to the lengths of the very shortest planned activities and a small amount of time is provided for unplanned activities. Since the model shows that $\epsilon y < \epsilon x$, we conclude that these practices do not make use of all the extra time made available by the shortening of other planned time allocations. We believe then that Model 6A represents a teacher's time decision pattern over only a part of a school day or parts of several school days.

Model 6 represents the <u>constant increase/proportional decrease</u> time decision pattern. This is a pattern in which some planned time allocations are increased by a constant amount of time and at the same time the lengths of most planned time allocations are shortened by a proportional amount of time. The regression line which summarizes this pattern is shown in Figure 4.11.

Model 6 represents what we call a decrease interaction time decision pattern. The name was chosen for two reasons. First, the slope of the regression line is less than one, indicating a decrease in the length of planned time allocations; and second, there is an interaction

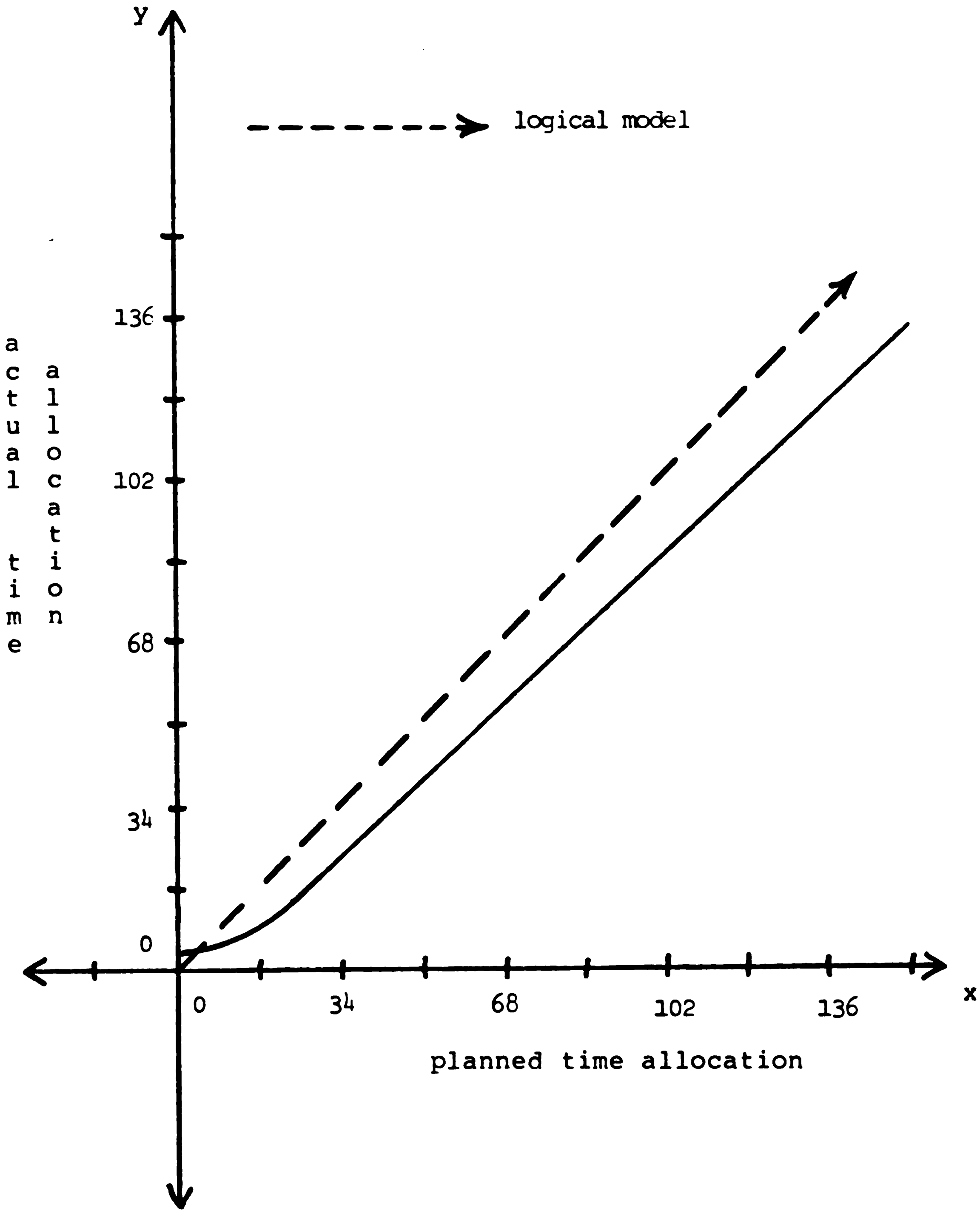


Figure 4.10

Regression Line Summarizing Theoretical Model 6A - Asymptotic Constant/Proportional Decrease Model involving length of planned time allocation and type of plan modification: short planned time allocations are increased by a constant amount of time and at the same time, decreased proportionately while longer planned time allocations are either not modified at all or are shortened proportionally.

The practice of increasing some planned time allocations by a constant amount of time suggests that the teacher underestimated the time needed for these planned activities; perhaps (s)he failed to allow for accessory activities. On the other hand, the practice of decreasing the length of other planned time allocations suggests that the teacher overestimated the amount of time needed for them. A teacher who plans in this way is a constant underplanner and a proportional overplanner. We call this kind of planner a decrease interaction planner.

Which planned time allocations does the decrease interaction planner generally increase and which ones does (s)he generally decrease? This can best be answered by referring to the regression line for a decrease interaction relationship shown in Figure 4.11. Line "A" in Figure 4.11 represents the regression line of the Logical Model, while Line "B" represents the regression line of the decrease interaction relationship. From point "P", where line "A" and "B" intersect, a line perpendicular to the x-axis is drawn which intersects the x-axis at "T". Point "T" is the reference point used to determine which planned time allocations a decrease interaction planner tends to increase and which ones (s)he tends to decrease. Those planned time allocations which are greater than the time at point "T" are generally decreased; we have defined these as long planned time allocations. Planned time

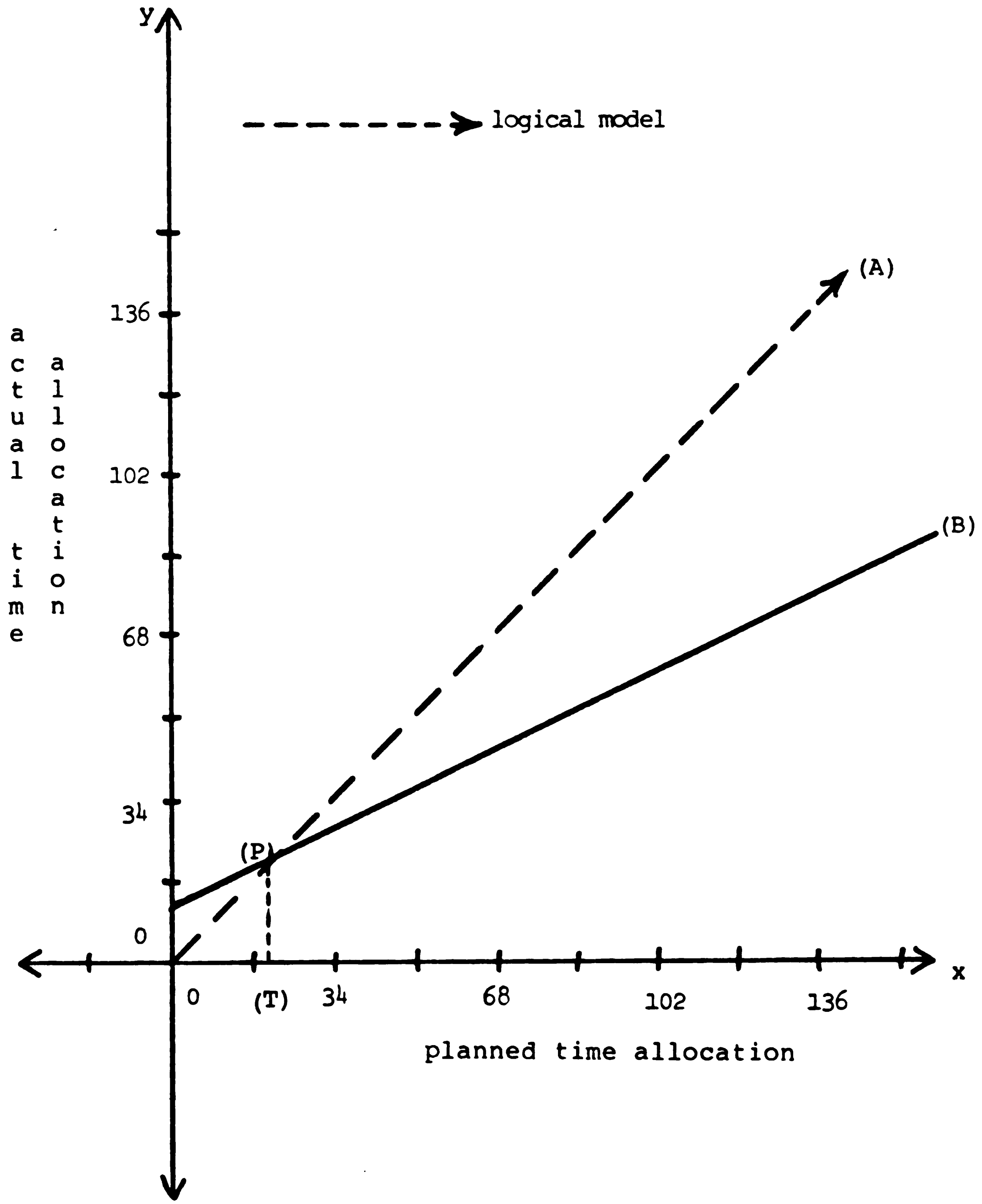


Figure 4.11

Regression Line Summarizing Theoretical Model 6 -
Decrease Interaction Model

allocations which are less than the time at point "T" are generally increased; we have defined these as short planned time allocations.

This concept is illustrated in Figure 4.11. In this example, the perpendicular line from the intersection of regression line "A" and "B" intersects the x-axis at "T", a planned time allocation of about seventeen minutes. Using the concept outlined above then, planned activities with planned time allocations longer than seventeen minutes will tend to be shortened and those with planned time allocations less than seventeen minutes will tend to be lengthened.

Since this is an interaction time decision pattern, the extent of the modification depends on the planned time allocations. The shortest planned time allocations, i.e., those with zero minutes, are lengthened an average of ten minutes, the largest increase for any planned time allocation. The amount of increase declines as the length of the planned time allocation increases. Using the example again to illustrate this characteristic, we see that planned time allocations of ten and five minutes are lengthened by about five and three minutes respectively. At point "T", planned time allocations are on the average not modified at all. Planned time allocations at this point, ("T"), are called "middle length" planned time allocations. Planned time allocations greater than those at point "T" are decreased by greater and greater amounts of time. It is assumed that some planned time allocations are occasionally shortened to the extent that the planned activity does not occur.

The modifications demonstrated by the foregoing example suggest that the decrease interaction planner underplans activities which require the shortest time allocations and overplans activities which require the longest time allocations. Evidently, (s)he accurately predicts how much time middle length planned time allocations will need because their planned length is not modified at all.

In summary then, Model 6 indicates that there are four general plan modifications that characterize the decrease interaction time decision pattern: (1) considerable time is provided for unplanned activities; (2) activities with short planned time allocations are provided more time than was intended; (3) activities with middle length planned time allocations are provided on the average the same amount of time that was intended; and (4) activities with long planned time allocations are provided less time than was intended.

What does the decrease interaction planner do with the time made available by decreasing the length of some planned time allocations? One way (s)he may use it is to engage his/her students in unplanned extemporaneous or routinized activities. Extemporaneous activities are activities a teacher decides to use on the spur of the moment; they have not been subject to any kind of previous preparation on his/her part. Routinized activities, on the other hand, are activities a teacher predesigns and holds in reserve (Yinger, 1977); (s)he can easily recall them to be used to deal with the problem of excess time. Both extemporaneous and routinized activities are considered unplanned, however, because the teacher did not allocate time to them in his/her plans.

Another way (s)he may use excess time is to provide more time than what (s)he had intended to planned activities which have short planned time allocations.

The decrease interaction planner may tend to rely on one method more than the other to make use of excess time. It is assumed, however, that (s)he consistently uses most of the excess time for unplanned activities; it does not seem likely that (s)he would be able to use very much of the excess time by increasing short planned time allocations.

Why does the decrease interaction planner only increase the lengths of the short planned activities? It may be that (s)he does not anticipate a need to use accessory activities with short activities, but (s)he recognizes their need with longer ones. Thus, (s)he allocates sufficient time to longer activities but not to the shorter ones.

Since Model 6 indicates that all the time made available by decreasing planned time allocations can be used to increase the lengths of the shortest planned time allocations and/or to provide time for unplanned activities, we believe it represents a teacher's time decision pattern over a full day or multiple days whether (s)he allocates all of the available school time or not.

Model 6 may also represent a teacher's time decision pattern for one kind of activity. In this case, the model indicates that the shorter planned time allocations for an activity, e.g., Reading are lengthened while the longer planned time allocations for it are shortened. And, middle length planned time allocations for the activity would, on the average, not be modified at all.

We believe that Model 6 is the most likely candidate to represent the time decision pattern of practicing teachers. This conclusion was drawn because Model 6 is the only model which accounts for all the available school time while at the same time, summarizing not only the type of time decision pattern teachers are expected to follow (linear) but also the different ways teachers probably modify their planned time allocations each day.

A different kind of interaction model results if a teacher modifies his/her planned time allocations by consistently decreasing some of them by a constant amount of time and proportionally increasing others. Model I represents the time decision pattern which results when planned time allocations are modified in this way. We call Model I the Increase Interaction Model because the slope of its regression line is greater than one and because there is an interaction involving length of planned time allocation and type of modification: short planned time allocations are decreased by a constant amount of time and at the same time they are increased by a proportional amount of time while longer planned time allocations are either not modified or are lengthened proportionally. This is just the reverse of what occurs within the decrease interaction time decision pattern. Model I does not represent reality though because it suggests a negative y intercept.

What model is appropriate then for representing the increase interaction time decision pattern? If the regression line of Model I is altered asymptotically, then Model 2A is the result. It appears that Model 2A will adequately represent the increase interaction time decision pattern. It is shown in Figure 4.12.

In a Model 2A time decision pattern, which planned time allocations are increased and which ones are decreased can be determined by using the same method that was used with the Model 6 time decision pattern.

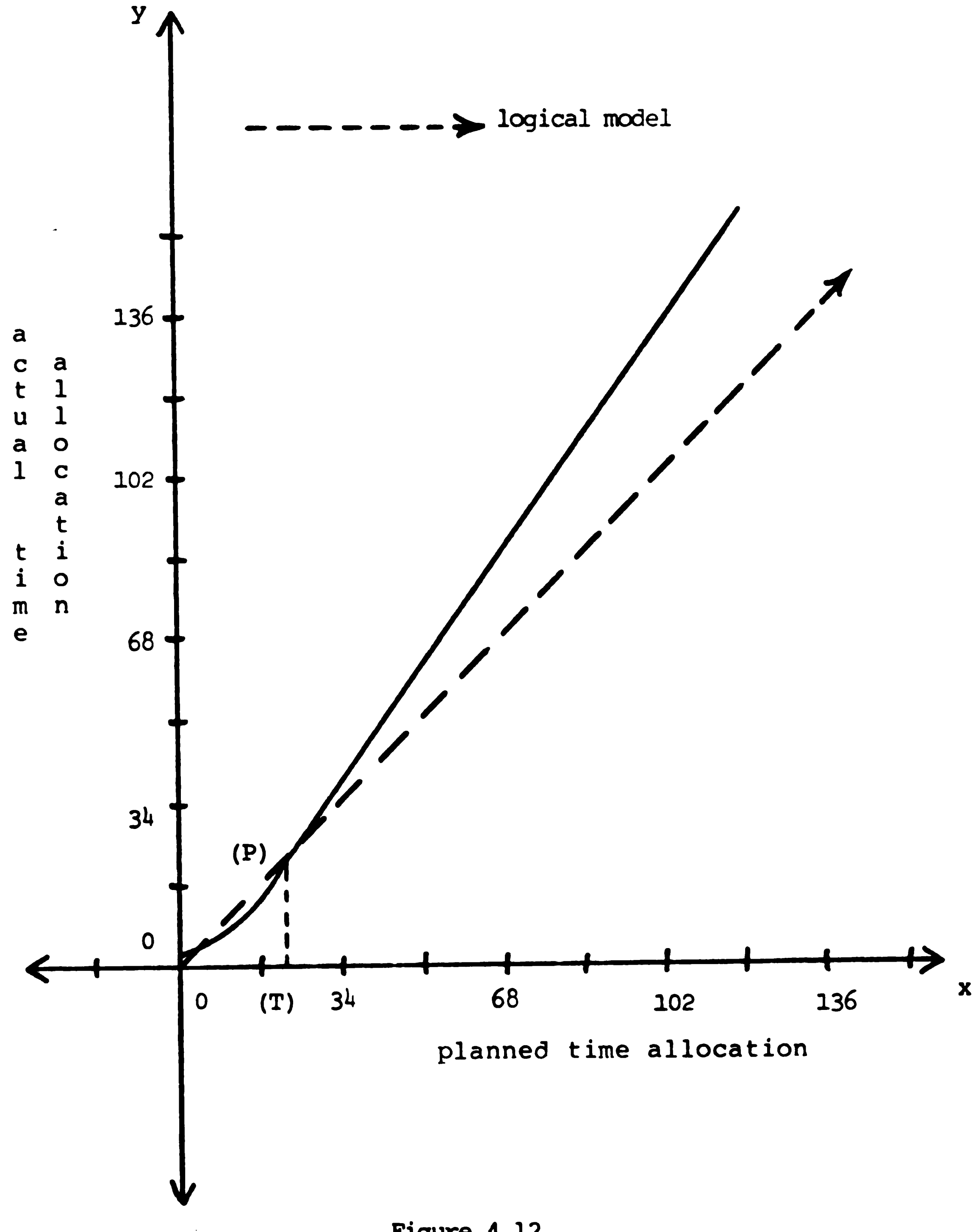


Figure 4.12

Regression Line Summarizing Theoretical Model 2A - Asymptotic Constant Decrease/Proportional Increase Model

How planned time allocations are modified in a Model 2A time decision pattern is exemplified by using the regression line in Figure 4.12. Using "T" as a reference, we find that planned time allocations longer than about nineteen minutes are lengthened; the amount of increase becomes larger as the length of the planned time allocations increases. Planned time allocations of less than nineteen minutes are shortened. But, because the regression line asymptotes, the amount of decrease does not steadily get larger as planned time allocations become shorter; instead, the amount of decrease becomes larger as the planned time allocations become shorter until at some point (in Figure 4.12, it is around twelve minutes), the amount of decrease then becomes smaller. Planned time allocations closest to zero and nineteen minutes then are decreased much less than those between these two points. And planned time allocations of around nineteen minutes are neither increased or decreased.

Model 2A with a regression line similar to one shown in Figure 4.12 may represent a teacher's time decision pattern over a full day or multiple days whether the teacher leaves time unallocated or not. This assumption is based on time usage suggested by the position of the regression line; its position suggests that all the time needed to lengthen long planned time allocations can be made available by shortening short planned time allocations. In other words, Model 2A with a regression line similar to the one in Figure 4.12 shows that $\varepsilon y = \varepsilon x$ for a teacher who allocates all the available school time. And it shows that $\varepsilon y > \varepsilon x$ for the teacher who allocates less than the available school time. In either case, Model 2A will account for all of the available school time.

If, however, the regression line of an increase interaction time decision pattern is more like the regression line shown in Figure 4.13, then it cannot describe a teacher's time decision pattern over a full day or multiple days unless (s)he leaves a large block of available school time unallocated. This assumption seems reasonable because the regression line suggests that most planned time allocations are lengthened, many of them by a large amount of time. Such a practice would require a large amount of excess time. Decreasing the shorter planned time allocations cannot provide nearly enough time to increase the longer planned time allocations as suggested by the regression line.

Summary

In this chapter, we proposed that fifteen different theoretical models could possibly represent time decision patterns of practicing teachers, i.e., the relationship between their planned time allocations and their actual time allocations. Each of these models is displayed in Table 4.1.

We divided the fifteen models into two categories. The first category contains those models which suggest teacher time decision patterns which are not likely to be followed by teachers. A model was judged as not representative of reality if it suggests one or more of the following characteristics:

(1) its regression line predicts most dependent variables to be zero;

(2) its regression line predicts at least one dependent variable to be less than zero;

(3) its regression line suggests a totally irrational decision making pattern for use of time compared to planned use of time.

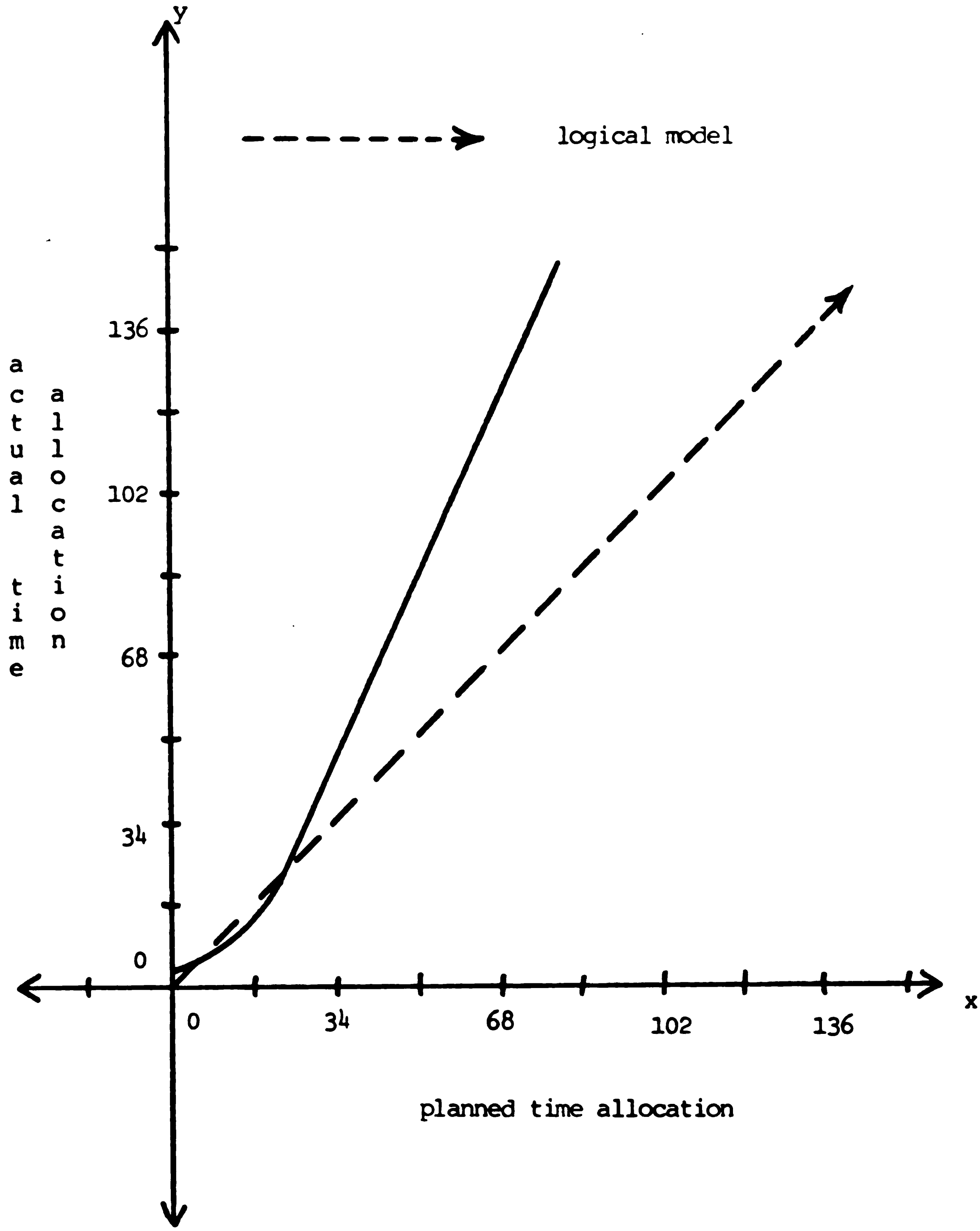


Figure 4.13

Regression Line Summarizing Theoretical Model 2A—
Asymptotic Constant Decrease/Proportional Increase Model

It was determined that Theoretical Models I-IX are not representative of reality because each of these models indicates that at least one of the above characteristics are present in the time decision pattern they represent.

The second category contained Theoretical Models 1, 2, 3, 4, 5, and 6. These models were shown to be capable of representing time decision patterns of practicing teachers.

Each model in the second category represents a time decision pattern by which a teacher could typically modify his/her planned time allocations, a practice we called plan modification.

Three general patterns of plan modification were outlined and discussed: (1) proportional modification; (2) constant modification; and (3) constant/proportional modification. The following models were shown to be the result of one of these kinds of plan modification. Each model represents a unique time decision pattern.

Model	Time Decision Pattern
1	proportional increase
2	constant/proportional increase
3	logical
4	constant increase
5	proportional decrease
6	decrease interaction

In addition to these six models, three non-linear models were identified for representing teacher time decision patterns. These models were:

Model	Time Decision Pattern
2A	increase interaction
4A	constant decrease
6A	constant/proportional decrease

In order for a model to represent a teacher's time decision pattern over a full day or multiple days, it had to show that either $\varepsilon y = \varepsilon x$ or that $\varepsilon y > \varepsilon x$. We concluded that Models 1, 2, 2A, 3, 4 and 6 meet these qualifications and so were judged to be representative of a teacher's time decision pattern over a full day or multiple days.

A model which shows that $\varepsilon y < \varepsilon x$ does not represent a teacher's time decision pattern over a full day or multiple days, but it could represent a teacher's time decision pattern over a part of a day or parts of days. Models which do not represent a teacher's time decision pattern over a full day or multiple days are Models 4A, 5 and 6A.

We concluded that Model 6 is the most likely candidate to represent the time decision pattern of practicing teachers. It appears to be the only model which accounts for all the available school time while at the same time, summarizing not only the type of time decision pattern teachers are expected to follow (linear) but also the different ways teachers probably modify their planned time allocations each day.

In the next chapter, the general pattern of teachers' planned and actual time allocations are presented and compared.

CHAPTER 5

DESCRIPTIONS OF TEACHERS' PLANNED AND ACTUAL TIME ALLOCATIONS

Introduction

The major purpose of this study was to describe the relationship between teachers' planned time allocations and their actual time allocations (the time actually provided for an activity).

The findings on teachers' planned and actual time allocations are presented in this chapter. They are organized into three categories: first, the general pattern of planned time allocations of the teachers in this study are described; second, the general pattern of actual time allocations by teachers in this study are described; and third, planned and actual time allocations are compared. Finally, a summary concludes this chapter.

General Pattern of Planned Time Allocations

There was a specified amount of time each day—determined by the local school board—that teachers were responsible to plan for and use in their classroom; we called this time "available school time" (AST). AST was defined as the total time available beginnning with the official start of school in the morning and continuing to the official end of school in the afternoon. In our analyses, we did not investigate teachers' daily planned and actual use of AST; rather, we looked at each teacher's planned and actual use of his/her total AST over the eight or nine combined days his/her classroom practice was observed.

The total AST that each teacher was required to plan for and use during the course of our observations is shown in Table 5.1. The total school time available to each teacher served as the baseline for describing and summarizing his/her planned and actual use of time.

Table 5.1

Total Available School Time by Teacher

Teacher	AST* (minutes)	Number of Days
1	3311	9
2	3312	9
3	2880	8
4	2960	8
5	3240	9
6	3243	9
Total	18947	

*Available school time

<u>Proportion of Time Allocated</u>

We found that teachers allocated on the average just over eighty-three percent of AST. The allocations of individual teachers did not differ greatly from this. The proportion of AST each teacher allocated to activities in the content areas is shown in Table 5.2. Only the allocations of Teachers 1 and 4 differed substantially from the overall mean. Teacher 1 allocated less than eighty percent of AST and Teacher 4 allocated nearly 100 percent of AST. All the other teachers allocated between eighty-one and a half and eighty-eight percent of AST.

On the average then, teachers left about seventeen percent of AST unallocated in their plans. Since the time teachers had available each school day was about 360 minutes, this finding indicates that teachers developed plans for a little less than five of the six hours of time available each day.

The proportion of AST allocated by lower grade teachers was quite similar to the overall average. Lower grade teachers were also quite similar to each other in the proportion of AST they allocated. But, upper grade teachers differed considerably from each other in the proportion of AST they allocated. On the average, however, the allocations of upper grade teachers were very similar to the overall mean.

Table 5.2

Proportion of AST Allocated by Teacher

Teacher		Minutes of AST Allocated	Percent of Total AST	
	1	2112	63.6	
upper level	2	2916	87.9	$\bar{x}$ = 83.3%
	4	2955	99.9	
	3	2423	84.1	
lower level	5	2715	83.6	$\bar{x}$ = 83.1%
	6	2640	81.5	
Total		15761	83.2	

Table 5.3 shows how teachers allocated AST by content areas. We found that teachers generally allocated about the same proportion of AST to Language Arts (12.7%), Reading (13.3%), Math (12.5%) and a slightly smaller proportion of AST to Science (9.4%). Of least concern to teachers in the allocation of time was Transitions; they allocated an average of only one percent of AST to Transition activities. The content area to which teachers allocated the largest proportion of AST was Breaks; they allocated nearly eighteen percent of AST (or over one hour per day) to activities in this area. Enrichment was a close second to Breaks with an allocation of over sixteen percent of AST.

TABLE 5.3

Proportion of AST Teachers Allocated to Content Area
(N = 18,947 Minutes)

Content Area	AST Allocated (Minutes)	Percent
Language Arts	2399	12.7
Reading	2525	13.3
Math	2365	12.5
Science	1790	9.4
Transitions	104	1.0
Breaks	3374	17.8
Enrichment	3103	16.4
Total	15760	83.1

Overall, we found that teachers allocated nearly one half—47.9%—of AST to activities in content areas which are commonly considered academic (Language Arts, Reading, Math and Science) and more than one-third of AST—35.3%—to activities in content areas that are for the most part non-academic (Transitions, Breaks and Enrichment). These findings imply that teachers intended to use only about one-half of the school day for academic pursuits.

There were grade level differences in the proportion of AST allocated to several of the content areas. Table 5.4 shows the proportion of AST upper and lower grade level teachers allocated. In two areas—Transition and Breaks—upper and lower grade teachers allocated an almost identical proportion of AST. But in the other content areas, grade level differences were noted. Upper grade teachers allocated a larger proportion of AST to Language Arts, Math and Science than did lower grade teachers, while lower grade teachers allocated a larger proportion of AST to Reading and Enrichment activities. Except for Reading and Science, the differences in allocations between upper and lower grade teachers were between 1.1 percent and 3.4 percent. The greatest differences between the two groups of teachers were in their allocations to Reading and Science. Lower grade teachers allocated over six percent more of AST to Reading than did the upper grade teachers. And, upper grade teachers allocated almost seven percent more of AST to Science than did lower grade teachers.

TABLE 5.4

Proportion of AST Grade Level Allocated to Content Areas

Content Area	Grade Level Upper N = 9583 minutes Percent	 Lower N = 9363 Minutes Percent
Language Arts	13.6	11.8
Reading	10.2	16.5
Math	13.0	11.9
Science	12.8	5.9
Transitions	1.0	1.1
Breaks	17.9	17.7
Enrichment	14.6	18.2
Total	83.1	83.1

These findings may reflect common sense notions about instructional expectations for different grade levels. Lower grade teachers may be expected to provide more time to Reading and Enrichment (Art, Music, Field Trips, etc.) than upper grade teachers. And, lower grade teachers may view Science as a content area more suitable for older students. Apparently grade level influences teachers' allocations to Reading and Science. If this is true, then educators need to investigate whether grade level is a legitimate consideration when allocating substantially different amounts of time to the content areas of Reading and Science.

Teachers differed from one another within all content areas in the proportion of AST they allocated. Proportion of AST teachers allocated to the content areas is shown in Table 5.5. Differences within Math and Science were not large. Four of the five teachers who taught Math allocated between 10.5 percent and 13.7 percent of AST to it. This is a fairly small range of difference. Teacher 2 was an exception. The 26.7 percent of AST (s)he allocated was much larger than the proportion allocated by any of the other teachers. A similar pattern occurred in Science. In this content area, five of the six teachers allocated between 4.6 percent and 7.7 percent of AST while Teacher 4 allocated a much larger proportion of AST (25.7 percent).

The proportion of AST individual teachers allocated to Language Arts, Reading, Breaks and Enrichment were more diverse, i.e., the differences between teachers in allocations for each of these content areas were somewhat larger than the differences between individual teacher's allocations in Math, Science and Transitions. Teachers' allocations to Reading typify this diversity. Of the six teachers, two allocated about eight percent of AST, one allocated about nine percent, another about fifteen percent, another about nineteen percent, and another about twenty-two percent. The content area for which teachers' allocations were the most similar was Transitions.

TABLE 5.5

Proportion of AST Individual Teachers Allocated to Content Areas

	Teacher					
Content Area	1 Percent	2 Percent	4 Percent	3 Percent	5 Percent	6 Percent
Language Arts	21.3	9.9	8.8	16.5	12.9	6.3
Reading	7.9	8.3	14.8	21.7	19.1	9.3
Math	*	26.7	11.7	11.5	13.7	10.5
Science	6.8	7.5	25.7	5.4	4.6	7.7
Transitions	0.0	0.4	3.0	0.3	2.4	0.8
Breaks	12.0	18.8	23.6	19.4	14.7	19.1
Enrichment	15.0	16.3	12.2	9.3	16.5	27.8
Totals	63.0	87.9	99.8	84.1	83.9	81.5

*Did not teach math

These findings have implications for research and policy. How much time should teachers plan to provide for various content areas? What factors influence teachers' planned time allocations? Should other sources of influence be considered? Is it defensible from a teaching/learning standpoint that teachers should make planned time allocations that are so different? Answers to these questions will contribute to our understanding of the teaching/learning process and make teaching a process that operates more in response to educationally sound decisions rather than from habit or personal choice.

Mean Time Allocated Per Interval

Teachers allocated AST to each content area in units of time we called planned intervals. The average time teachers allocated per planned interval for each content area is shown in Table 5.6.

We found that teachers allocated just over one-half hour on the average to intervals of Language Arts (39.3 minutes), Reading (34.6 minutes) and Science (38.9 minutes), and just under one-half hour on the average to intervals of Break (28.1 minutes). The content areas which were allocated the greatest amount of time per interval were Math and Enrichment: Math was allocated almost one hour on the average per interval and Enrichment was allocated nearly three-fourths of an hour per interval on the average. Teachers allocated just under eight minutes per interval for Transitions, the least amount of time allocated per interval for any content area.

The mean time per interval does not adequately represent teachers' allocation patterns, however. We discovered that there was large variation in the time teachers allocated to intervals within content areas. The standard deviations shown in Table 5.6 are a measure of this variation. We can easily see the extent of variation in each content area by referring to the illustration in Figure 5.1. It is apparent from Figure 5.1 that the greatest amount of variation occurred in the content areas of Language Arts, Reading, Math and Enrichment. In these content areas, the variance ranged from a low of about nineteen minutes in Enrichment to a high of nearly thirty minutes in Language Arts. Variance was less in Science and Breaks, but was still fairly large. The least variance occurred in Transitions.

Table 5.6

Means and Standard Deviations of Intervals
Planned by Teachers for Content Areas

Content Area	Number of Intervals	$\overline{X}$	Standard Deviation
Language Arts	61	39.3	27.9
Reading	73	34.6	22.3
Math	43	55.0	23.2
Science	46	38.9	14.8
Transitions	26	7.9	5.4
Breaks	120	28.1	14.0
Enrichment	70	44.3	18.9

Generally, upper grade teachers differed from lower grade teachers in the average time allocated to intervals within content areas. These findings are shown in Table 5.7. Only in Science and Transitions did upper and lower grade teachers allocate similar time per interval; their average allocations differed by less than three minutes in Science and by only one-half minute in Transitions. Upper grade

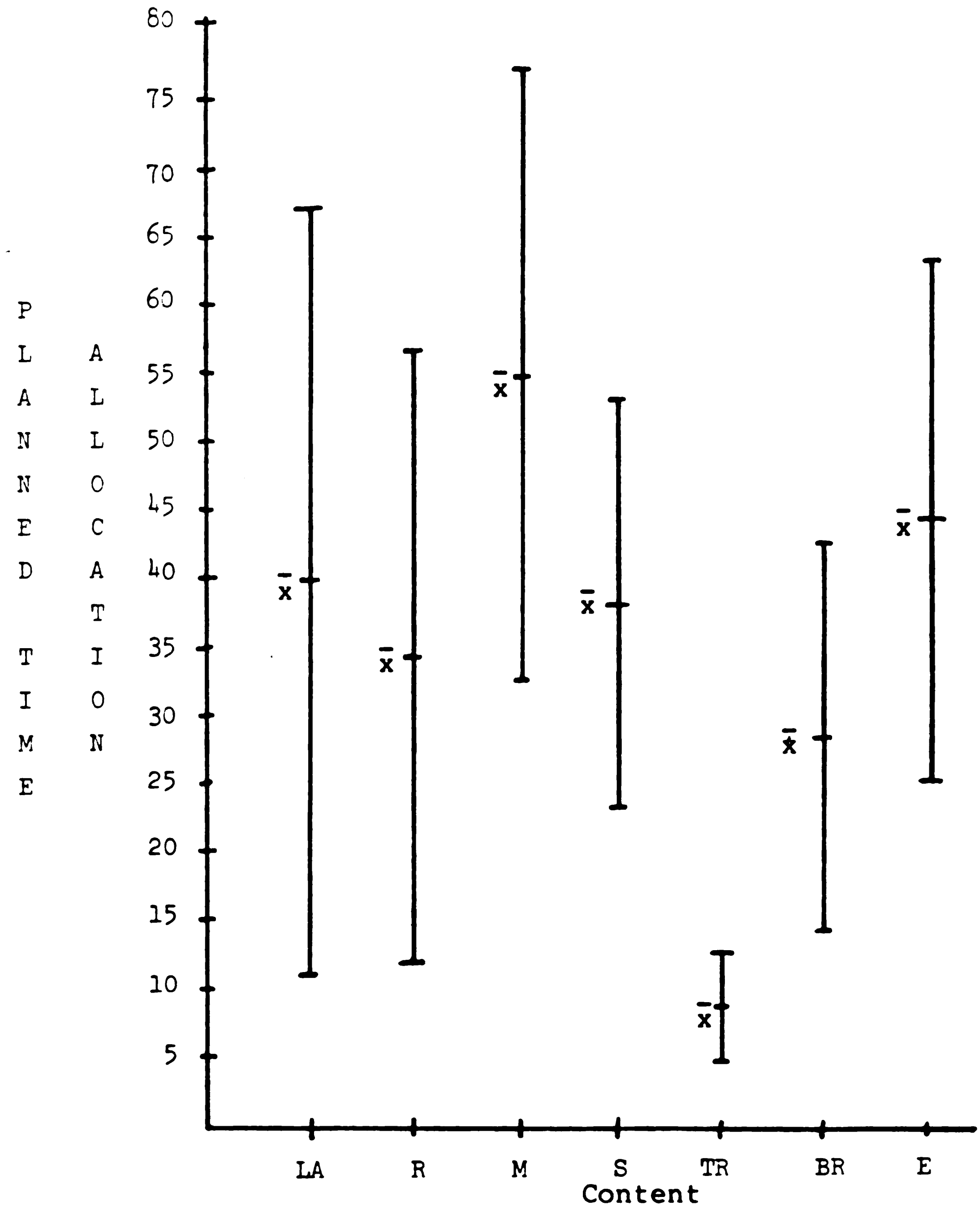


Figure 5.1

$\pm$One Standard Deviation from Mean of Teachers' Planned Intervals by Content Area teachers allocated more time per interval to all other content areas (Language Arts, Reading, Math, Breaks and Enrichment). The differences between upper and lower grade teachers in these content areas ranged from 4.8 minutes more per interval on the average in Reading to 13.2 minutes more per interval in Enrichment. In other words, upper grade teachers intended to conduct longer class periods than did lower grade teachers.

Upper and lower grade teachers were similar in that both groups allocated the greatest time per interval to Math. And of the four academic areas, both groups allocated the least time per interval to Reading.

The number of intervals upper and lower grade teachers intended for Language Arts, Math and Transitions were similar; but, lower grade teachers planned many more intervals in Reading, Breaks and Enrichment than did upper grade teachers while upper grade teachers planned many more intervals in Science. The time lower grade teachers intended to provide for Reading was greater than upper grade teachers intended and greater than the time planned for any of the other three academic areas. Upper grade teachers, on the other hand, planned many fewer intervals for Reading than did lower grade teachers. As a result, the time upper grade teachers intended to provide for Reading was less than lower grade teachers intended; and it was less than the time they planned for any of the other three academic areas.

Within each content area, differences were found between individual teachers in the average time allocated per interval. These findings are displayed in Table 5.8. Individual teacher allocations were most alike in Breaks. In this area, four of the six teachers allocated

TABLE 5.7

Mean Interval Planned by Grade Level for Content Areas

Content Area	Upper $\bar{X}$	Upper No. of Intervals	Lower $\bar{X}$	Lower No. of Intervals
Language Arts	41.9	31	36.7	30
Reading	37.7	26	32.9	47
Math	62.5	20	50.7	22
Science	39.8	31	37.0	15
Transitions	7.6	13	8.1	13
Breaks	32.4	53	24.7	67
Enrichment	51.9	27	39.6	43

TABLE 5.8

Means of Intervals Planned by Individual Teachers for Content Areas

Content Area	Teacher 1 $\bar{X}$	2 $\bar{X}$	4 $\bar{X}$	3 $\bar{X}$	5 $\bar{X}$	6 $\bar{X}$
Language Arts	58.8	36.7	26.5	26.4	60.0	41.0
Reading	42.8	46.0	29.3	31.3	44.3	23.1
Math	20.0*	73.8	43.8	47.1	63.6	42.5
Science	45.0	62.5	34.5	38.8	30.0	41.7
Transitions	—	4.7	8.5	10.0	7.8	8.3
Breaks	44.2	38.8	25.0	25.5	25.0	23.8
Enrichment	55.6	60.0	40.0	29.8	38.2	45.0
Grand Mean	51.5	49.4	29.0	30.0	36.2	32.6

*Teacher planned only one interval.

about twenty-five minutes per interval. The allocations of the other two teachers though were quite a bit larger than this. Within each of the other content areas, at least two teachers allocated similar time per interval; but, often a teacher's average time allocations within a content area were quite different from the allocations of the other teachers. In Reading for example, Teachers 1, 2 and 5 allocated on the average between forty-two and forty-six minutes per interval, quite similar time per interval. The average allocation to Reading by each of the other three teachers was much lower than forty-two minutes, and their average allocations differed from each other to a greater extent than did the allocations of Teachers 1, 2 and 5.

The wide differences between teachers in the mean interval length within content areas may reflect differing strategies, differing teacher perceptions of student aptitudes and needs and different curricula content objectives. It may also reflect differing placement of activities in relation to Breaks such as recess and lunch. Smith found that the activity which occurred just before schoolwide scheduled events such as recess and Breaks normally lasted a different length of time than if the same activity did not occur just prior to one of these Breaks, i.e., first in the school day (Smith, 1977).

The variance of teacher's time allocations per interval within content areas differed between teachers. These variations as measured by standard deviations are shown in Table 5.9.

In Language Arts there were large differences in interval variance between teachers. The greatest difference was between Teachers 1 and 4: Teacher 1's intervals varied by almost three-fourths of an hour while the intervals of Teacher 4 varied by only 7.1 minutes.

TABLE 5.9

Standard Deviations of Intervals Planned
By Individual Teachers for Content Areas

Content Area	Teacher 1 SD	Teacher 2 SD	Teacher 4 SD	Teacher 3 SD	Teacher 5 SD	Teacher 6 SD
Language Arts	43.8	27.2	7.1	10.4	26.0	16.7
Reading	7.1	22.7	17.6	19.0	30.6	16.9
Math	—	32.9	3.7	13.5	2.4	9.6
Science	16.6	32.0	6.1	6.3	10.6	14.7
Transitions	—	2.9	2.4	—	8.3	5.8
Breaks	14.0	18.8	13.2	7.4	11.1	11.5
Enrichment	16.1	15.8	20.9	12.0	18.6	16.9

A similar pattern of large differences in interval variance between teachers occurred in Reading, Math and Science, but the range of differences was not as great for these content areas as it was for Language Arts. Differences in interval variance between teachers in the content areas of Transitions, Breaks and Enrichment were much smaller than in the other content areas suggesting that teachers perceptions and planned use of these content areas are quite similar.

Variance in interval length tended to follow one of three different patterns. Some teachers consistently allocated about the same amount of time per interval to a particular content area; thus, the variance of their allocations was low. This allocation pattern is identified by a low standard deviation, i.e., less than ten. The allocations of Teachers 4 for Language Arts, 1 for Reading and 3 and 4 for Science exemplify this pattern.

A second allocation pattern is characterized as having moderate variance. Standard deviations in this pattern fall between ten and twenty. Teachers 3 and 6 followed this pattern for Language Arts and Teachers 3, 4, and 6 followed it for Reading.

The third allocation pattern is characterized by large variance. Standard deviations greater than twenty identify this pattern. The allocations of Teacher 1 for Language Arts, Teacher 2 for Math and Science and Teacher 5 for Reading fit this third pattern.

Table 5.10 shows which of these three patterns of variance characterizes teachers' allocations in each content area. The allocations of each teacher except Teacher 6 varied at least once by each of the three different ways; but, it appears that a teacher's time allocations varied most often in only one of the three ways. The allocations of Teacher 6 for instance varied moderately in five of the seven content areas. And, the allocations of Teachers 2, 3 and 4 varied the same way in four of the seven content areas. The least conformity to a single pattern of variance was by Teachers 1 and 5: the allocations of these teachers varied the same way in only three of the seven content areas.

This finding that a teacher's interval variance is similar across content areas suggests that teachers have a characteristic pattern of planned time allocations. If so, then teachers may not be making planned time allocations that are responsive to student and content needs.

The findings on variance may also suggest that in the four academic areas, teachers differed substantially in the ways they intended to conduct their classroom activities. This conclusion is based on the assumption that instructional strategies employed during intervals of one length may be different from instructional strategies employed during intervals of other lengths. For example, lecture type Math activities may often be the same length while individual study Math activities may often differ substantially in length.

TABLE 5.10

Patterns of Variation in Interval Length
By Individual Teachers in Content Areas

	Teacher					
Content Area	1	2	4	3	5	6
Language Arts	H	H	L	M	H	M
Reading	L	H	M	M	H	M
Math	-	H	L	M	L	L
Science	M	H	L	L	M	M
Transitions	-	L	L	-	L	L
Breaks	M	M	M	L	M	M
Enrichment	M	M	H	M	M	M

H = high variation from the mean, standard deviation > 20
M = moderate variation from the mean, standard deviation $\geq$ 10 $\leq$ 20
L = low variation from the mean, standard deviation < 10

Teachers then, whose intervals were all of a similar length, i.e., a low standard deviation, no doubt planned to rely on one kind of instructional strategy, while teachers whose intervals were more varied, i.e., moderate to high standard deviations, probably planned to rely on instructional strategies different from those of the teacher with intervals of low standard deviation.

In general, findings on number of opportunities planned, mean interval length and interval variance have implications for material selection and instructional strategies. It seems reasonable that intervals should be planned that allow the selected materials and strategies to operate most effectively.

Summary of Findings on Planned Allocations

Our major findings on teachers' planned time allocations are summarized below:

1. Teachers allocated an average of 83.2 percent of AST; five of the six teachers allocated over 81 percent of AST.

2. Teachers allocated about thirteen percent of AST to each content area of Language Arts, Reading and Math.

3. Teachers allocated almost one-fourth of AST to Transitions and Breaks.

4. There were substantial grade level differences in the proportion of AST allocated to Reading, Science and Enrichment. Less substantial differences were noted in other content areas.

5. There were wide differences between some teachers within content areas in the proportion of AST they allocated.

6. Teachers allocated about one-half of AST to the four academic content areas.

7. There were differences between grade levels in the proportion of AST allocated to the four academic content areas.

8. The average planned interval length for most content areas was between twenty-eight and forty-four minutes.

9. There were substantial differences between grade levels in average planned interval length for all content areas.

10. There were substantial differences between teachers in average planned interval length for all content areas.

11. There was large variance in planned intervals within content areas.

12. There were substantial differences between teachers in planned interval variance within content areas.

13. Teachers' planned interval variance is similar across content areas.

General Pattern of Actual Time Allocations

Proportion of Time Provided

The proportion of AST teachers provided for the different content areas is shown in Table 5.11. Overall, teachers provide slightly more than forty-six percent of AST for activities in the four academic content areas. Each of these four content areas received a different proportion of AST, but the differences between them were not large. Language Arts was given the largest proportion of AST (14.0 percent) while Science was given the smallest proportion (10.2 percent). Reading and Math were given an almost identical proportion of AST: 11.3 percent for Reading and 11.4 percent for Math. Enrichment activities were given a larger proportion of AST (18.8 percent) than was given to any of the four academic content areas. By far, the largest proportion of AST was provided for Breaks: it received 25.5 percent of AST. Together, the purely non-academic areas of Transition and Breaks were given 34.3 percent, or a little more than one-third of AST.

The proportion of AST upper and lower grade level teachers provided for the different content areas is shown in Table 5.12. From the table we determine that the sum of the proportions of AST each

TABLE 5.11

Proportion of AST Teachers Provided for Content Areas

Content Area	AST Provided (Minutes)	Percent
Language Arts	2649	14.0
Reading	2143	11.3
Math	2158	11.4
Science	1929	10.2
Transitions	1661	8.8
Breaks	4823	25.5
Enrichment	3583	18.8
Total	18946	100.0

TABLE 5.12

Proportion of AST Grade Levels Provided for Content Areas

	Grade Level	
Content Area	Upper Percent	Lower Percent
Language Arts	15.4	12.5
Reading	8.2	14.5
Math	10.7	12.1
Science	13.0	7.3
Transitions	9.8	7.9
Breaks	25.3	25.4
Enrichment	17.6	19.8
Total	100.0	100.0

group of teachers provided for the academic content areas of Language Arts, Reading, Math and Science was just about the same: upper grade teachers provided a total of 47.3 percent of AST to them while lower grade teachers provided a total of 46.4 percent of AST. Grade level difference then was less than one percentage point.

The two groups of teachers differed, however, in the proportion of AST they provided for each content area. Lower grade teachers provided a greater proportion of AST for both Reading and Math than did upper grade teachers; but upper grade teachers provided a greater proportion of AST to Language Arts and Science than did lower grade teachers.

The biggest difference between upper and lower grade teachers in the proportion of AST provided occurred in the Reading and Science content areas: lower grade teachers provided 14.5 percent of AST for Reading while upper grade teachers provided only 8.2 percent of AST for Reading; in other words, lower grade teachers provided nearly two times more AST for Reading than upper grade teachers did. The difference between upper and lower grade teachers in the proportion of AST they provided for Science was just as large, except the grade level which provided the largest proportion of AST was reversed: upper grade teachers provided a greater proportion of AST to Science than did the lower grade teachers.

Both upper and lower grade teachers provided a similar proportion of AST to Transition, Breaks, and Enrichment activities. Breaks was the content area which was provided the largest proportion of AST by both upper and lower grade teachers; it received just over twenty-five percent of AST or more than one-fourth of the AST.

Except for Transitions and Breaks, we found that there were substantial differences between teachers within content areas in the proportion of AST they provided. These findings are displayed in Table 5.13. The differences in Transitions were quite small. Several teachers differed from one another by less than one percentage point. The biggest difference was only 5.5 percentage points between Teachers 3 and 6. Similarly, the differences in Breaks were small. Except for Teachers 3 and 5, the differences were less than one percentage point.

Differences between teachers in the proportion of AST they allocated within the other content areas were more extensive. A few teachers within each content area provided similar proportions of AST, but the proportions of AST provided by other teachers within each content area differed substantially. The disparity between teachers in the proportion of AST they provided is graphically illustrated in Figure 5.2. Reading and Science were the content areas in which the differences were the greatest: the time some teachers provided differed by nearly ten times from that provided by other teachers. There were also large differences between teachers in the proportion of AST allocated to Language Arts, Math and Enrichment.

<u>Mean Time Provided Per Opportunity</u>

Teachers provided time to the different content areas in segments we call observed intervals. To facilitate our discussion, we will refer to an observed interval as an opportunity.

The average time teachers provided per opportunity in the different content areas is displayed in Table 5.14.

Generally, we found differences between content areas both in the number of opportunities teachers provided and in the mean time an

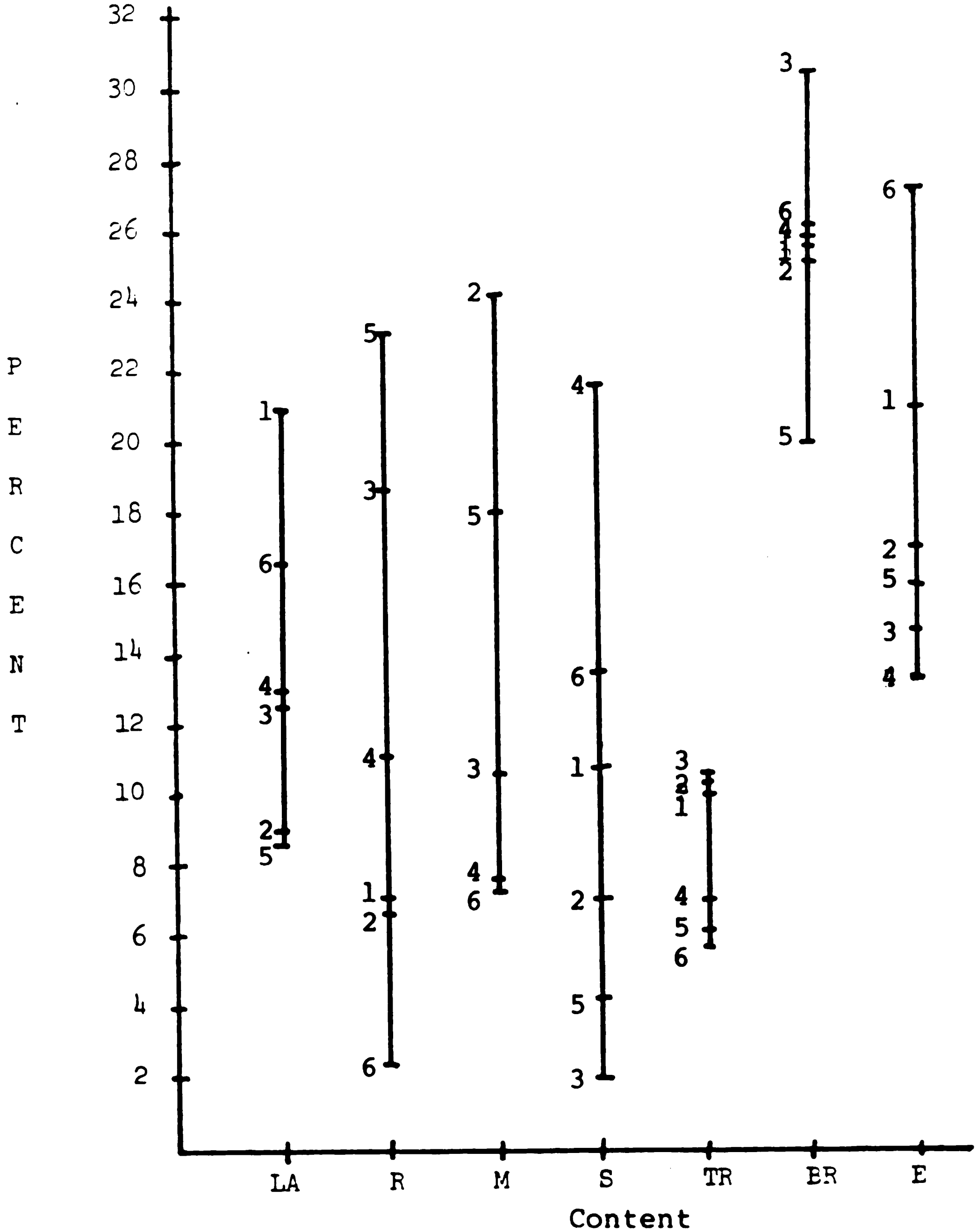


Figure 5.2

Proportion of AST Individual Teachers Provided for Content Area

TABLE 5.13

Proportion of AST Individual Teachers Provided For Content Area

Content Area	Teacher 1 %	2 %	4 %	3 %	5 %	6 %
Language Arts	21.3	8.9	12.9	12.4	8.7	16.4
Reading	7.2	6.6	11.1	18.5	23.3	2.2
Math	—	24.2	7.6	10.5	18.3	7.3
Science	10.8	7.0	22.2	2.5	4.7	14.1
Transitions	10.6	11.1	7.4	11.6	6.3	6.1
Breaks	25.4	25.1	25.5	30.5	20.4	25.7
Enrichment	21.2	16.9	13.3	14.8	16.4	27.6
Totals	96.5	99.8	100.0	100.8	98.1	99.4

TABLE 5.14

Means and Standard Deviations of Opportunities Teachers Provided for Content Areas

Content Area	N	$\bar{X}$*	SD
Language Arts	103	25.7	22.2
Reading	86	24.9	19.3
Math	48	45.0	24.7
Science	50	38.6	14.7
Transitions	407	4.1	2.8
Breaks	230	21.0	16.8
Enrichment	100	35.4	20.4

*Minutes

opportunity lasted. Teachers provided a great many opportunities for activities in some content areas and much fewer opportunities for activities in other content areas.

By far the greatest number of opportunities were provided for Transitions and Breaks; but the mean time these opportunities lasted was also the shortest of all content areas. Even though opportunities for Transition and Breaks were shorter than opportunities in any of the other content areas, they accounted for nearly one-third of AST.

Teachers provided about the same time on the average for opportunities in Language Arts (25.7 minutes) and Reading (24.9 minutes), but they provided nearly twenty more opportunities for Language Arts than they did for Reading. Of the four content areas of Language Arts, Reading, Math and Science, opportunities for Language Arts and Reading were provided the least time, just under one-half hour on the average. Opportunities for Math and Science averaged nearly three-fourths of an hour. This was quite a bit more time than teachers provided for Language Arts or Reading opportunities; but Math and Science were given only about one-half of the opportunities given to Language Arts or Reading. Opportunities for Enrichment also lasted longer on the average than either Language Arts or Reading and it was provided quite a few more opportunities than Reading but a few less than Language Arts.

Considering both the number of opportunities and mean opportunity length, Reading, Math and Science were all provided about the same amount of time. The mixture of opportunities and mean opportunity length was just different for each of them. Language Arts though was provided substantially more time than the other three academic content areas. The reason, Language Arts was provided many more opportunities. Once again then we find that the number of opportunities was a significant factor in the total amount of time provided.

Fewer opportunities were provided for Math and Science than for any other content area.

Standard deviations shown in Table 5.14 indicate that there was large variance in the time teachers provided for opportunities within most content areas. Figure 5.3 illustrates this variance by showing one standard deviation greater and lesser than the mean opportunity time for each content area. Among the four academic content areas, the least variation occurred in Science while the greatest variation occurred in Math. The amount of time provided to opportunities in all other content areas (except Transition) was also found to vary by quite large margins. The variance was similar for opportunities in Language Arts, Reading and Enrichment activities. For Transitions, the variation was quite small.

The findings on variance may indicate teachers' flexibility in response to differing time needs of student and content. It may also indicate that teachers used content areas for purposes which differed from typical content goals. For instance, Reading may have been used just after recess and just before the final bell of the day. In this case, Reading would only last five to ten minutes. Reading then functioned as a Transition activity or time filling activity. A Math activity that lasted sixty to seventy minutes may have provided time for the teacher to check papers, arrange materials for another activity or counsel with students. In this case, the Math activity functioned as a management activity. It may be that teachers rely on one content

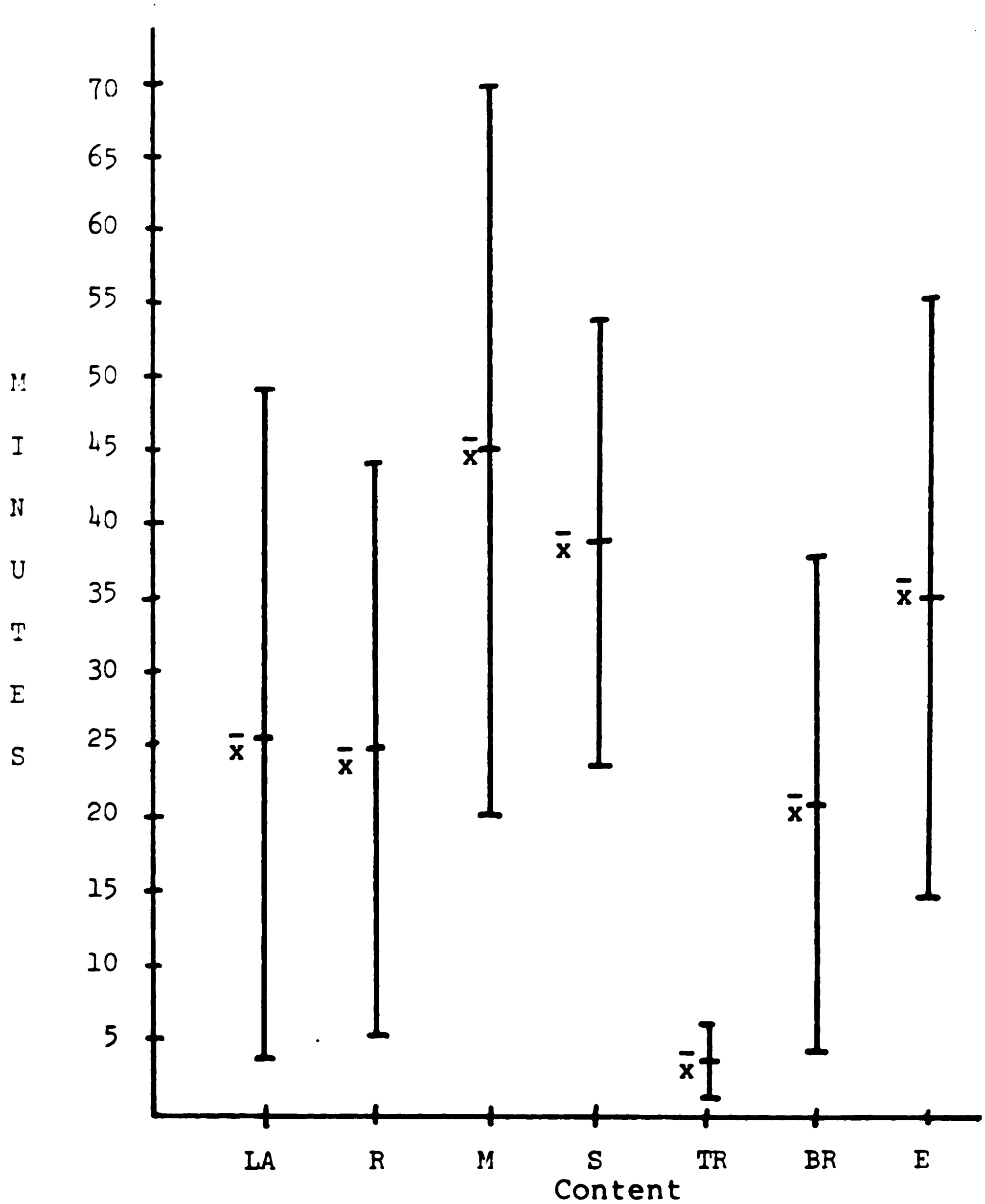


Figure 5.3

±One Standard Deviation from Mean Opportunity
Teachers Provided for Content Area

area such as Reading more often than others for a particular purpose such as "time fill". This could explain why Language Arts or Reading have very short intervals while Math and Science do not.

Overall, upper and lower grade level teachers provided nearly an identical number of opportunities, 512 by the upper grade teachers and 511 by teachers in the lower grades. Differences were found, however, between upper and lower grade teachers in the number of opportunities each provided within content areas as well as in the mean time provided per opportunity. These findings are shown in Table 5.15.

TABLE 5.15

Mean Opportunity Grade Levels Provided for Content Areas

Content Area	Grade Level Upper N = 512		Grade Level Lower N = 511	
	N	$\bar{X}$	N	$\bar{X}$
Language Arts	53	27.9	50	23.4
Reading	35	22.4	51	26.6
Math	22	46.7	26	43.5
Science	32	39.0	18	37.9
Transitions	220	4.3	187	3.9
Breaks	112	21.7	118	20.7
Enrichment	38	44.1	62	29.9

One major difference between upper and lower grade teachers was in the number of opportunities and mean time per opportunity in Enrichment. Upper grade teachers provided far fewer opportunties than did the lower grade teachers but provided much more time on the average to each opportunity. Another big difference between the two groups of teachers occurred in Science. Both groups provided about the same time per opportunity on the average, but upper grade teachers provided nearly twice as many opportunities as did the lower grade teachers. For the most part, the differences on these dimensions between the two groups of teachers across other content areas were not very large.

Differing teacher response to curriculum, student needs and aptitudes may help explain grade level differences in Reading, Science and Enrichment opportunities.

Table 5.16 shows the mean time per opportunity individual teachers provided in each content area. We found that in each content area, four or five teachers often provided about the same amount of time per opportunity while the other one or two teachers in each content area provided much more or less time per opportunity. Language Arts illustrates this pattern. The time Teachers 2 (seventeen minutes) and 3 (16.2 minutes) provided per opportunity was much less than the time (around thirty minutes) provided by Teachers 1, 4, 5 and 6. This pattern occurred in each of the other content areas as well. Similar mean times per opportunity provided within content areas suggest that teachers may have a common notion about how long an activity in a particular content area should last.

Most teachers differed quite a bit from one another in the number of opportunities they provided for each content area. An

TABLE 5.16

Mean Opportunity Provided by Individual Teachers for Content Areas

	Teacher					
Content Area	1 $\bar{x}$	2 $\bar{x}$	4 $\bar{x}$	3 $\bar{x}$	5 $\bar{x}$	6 $\bar{x}$
Language Arts	32.0	17.0	34.7	16.2	31.1	28.0
n	28	17	22	11	9	19
Reading	23.7	21.8	22.0	21.3	37.8	11.8
n	10	10	25	15	20	6
Math	—	57.2	28.3	33.4	59.3	33.9
n	1	14	8	8	10	7
Science	44.6	38.8	36.5	35.5	30.6	41.6
n	8	6	2	18	5	11
Transitions	4.3	4.7	3.6	3.7	4.9	3.6
n	82	78	90	60	42	55
Breaks	20.0	20.8	25.1	19.5	26.4	17.4
n	42	45	45	30	25	48
Enrichment	45.1	43.1	43.7	18.5	40.9	34.4
n	16	13	23	9	13	26

example is Reading. Teacher 4 provided twenty-five opportunities while Teacher 6 provided only six. Since the mean time per opportunity was often similar across teachers, the number of opportunities was an important factor in the total time provided.

Individual teachers also differed from one another within content areas in the variance of opportunities they provided. Opportunity variance as measured by standard deviation is shown in Table 5.17. Differences in variance between teachers were greatest in the content areas of Language Arts, Reading, Math and Science. The most dramatic differences between teachers occurred in Math; the length of opportunities for Math provided by Teacher 3 varied no more than 3.2 minutes while opportunities provided by Teacher 2 varied by up to 33.2 minutes. Variation of opportunities for Transitions, Breaks and Enrichment were quite similar across all teachers.

The variance of opportunities provided by Teachers 2, 3 and 4 tended to fall into the moderate variance range more often than into the other two ranges. Opportunity variance for the other three teachers was nearly evenly divided among the three variance patterns discussed earlier.

Patterns of variation for each teacher are displayed in Table 5.18. From this table we can see that opportunities (excluding opportunities for Transition which we would expect to have low variance) across teachers typically varied moderately (between ten to twenty minutes). Regardless of the content area then, opportunities of non-typical length most often differed from opportunities of typical length by only ten to twenty minutes. This finding suggests that teachers are willing to alter their normal classroom time allocation patterns, but only within certain time constraints, i.e., ten to twenty minutes.

TABLE 5.17

Variance of Opportunities Provided by Individual Teachers for Content Areas

Content Area	Teacher 1 SD	2 SD	4 SD	3 SD	5 SD	6 SD
Language Arts	31.7	14.1	14.9	10.8	28.2	18.6
Reading	9.7	10.8	18.0	6.9	29.0	8.4
Math	*	33.2	19.8	3.2	15.2	10.3
Science	17.7	15.9	0.7	10.8	7.5	20.3
Transitions	2.7	2.8	2.3	2.7	4.2	2.0
Breaks	18.6	18.3	19.9	14.7	10.4	14.3
Enrichment	17.4	18.0	14.9	19.4	17.3	21.2

*Did not teach math.

TABLE 5.18

Patterns of Variation in Opportunities Provided by Teachers for Content Areas

Content Area	Teacher 1	2	4	3	5	6
Language Arts	H	M	M	M	H	M
Reading	L	M	M	L	H	L
Math	*	H	M	L	M	M
Science	M	M	L	M	L	H
Transitions	L	L	L	L	L	L
Breaks	M	M	M	M	M	M
Enrichment	M	M	M	M	M	H

*Did not teach math.

High variation (H) S.D. > 20
Moderate variation (M) S.D. $\geq$ 10 < 20
Low variation (L) S.D. $\leq$ 10

Summary of Our Findings on Actual Time Allocations

Our major findings on opportunities teachers provided for activities in the content areas are summarized below:

1. Teachers provided 46.9 percent or nearly one-half of AST to activities in Language Arts, Reading, Math and Science.

2. Teachers provided between ten percent and fourteen percent of AST to activities in each of the four academic content areas.

3. Upper grade teachers provided nearly the same proportion of AST to the four academic content areas combined as did lower grade teachers.

4. Upper grade teachers provided a different proportion of AST to each of the four academic content areas than did the lower grade teachers.

5. Teachers provided nearly one-third of AST for Transition and Breaks.

6. There were wide differences between most teachers within content areas in the proportion of AST they provided. The largest range of difference between teachers occurred in Reading.

7. The number of opportunities teachers provided differed across content areas. Of the four academic content areas, teachers provided the greatest number of opportunities for Language Arts and the fewest to Math and Science.

8. The average length of an opportunity differed across content areas. Opportunities in Math lasted longer on the average than opportunities in any other content area. Opportunities in Language Arts and Reading lasted on the average about the same

length of time.

9. Upper and lower grade teachers provided a similar number of opportunities in only three content areas: Language Arts, Math and Breaks.

10. In all content areas except Reading, the opportunities upper grade teachers provided lasted longer on the average than the opportunities provided by lower grade teachers.

11. In each content area at least four of the six teachers provided a similar amount of time on the average per opportunity.

12. Number of opportunities appears to be a critical factor in total time provided.

13. The variance of opportunities within content areas differed greatly across most teachers.

14. The variance of opportunities was similar across content areas for three teachers and different across content areas for three teachers.

Comparison of Teachers' Planned and Actual Time Allocation

The findings on the proportion of AST teachers allocated supports the findings of other researchers that teachers commonly predetermine how they intend to use time in the classroom (Smith 1977, Clark and Yinger 1979; Clark and Elmore 1979; Morine-Dershimer 1977; Smith and Sandelbach 1979; Yinger 1979). Teachers in this study, however, failed to make plans for a substantial part of AST; they left nearly seventeen percent of AST on the average unallocated in their plans. This unallocated time represents almost one hour per day per teacher.

An incomplete written plan does not necessarily indicate the absence of a planned use for AST however, as Morine-Dershimer found

(Morine-Dershimer 1977). It is possible teachers in this study behaved similarly to the teachers in her study and had a mental image of how they intended to use the time. For instance, teachers may have intended to use established routines for some or all of the unallocated time; if this were the case, familiarity with the routine(s) would have made a written plan unnecessary. From our viewpoint though, we treated unallocated time as though it were unplanned. We did not seek to identify whether or not teachers possessed a mental image of how they intended to use the unallocated time, only whether there was unallocated time and if so, how the unallocated time was actually used. A comparison of the findings presented in Table 5.3 with those present in Table 5.11 helps identify how teachers used unallocated time. These findings are set side by side in Table 5.19.

From this table we see that the content areas of Reading and Math were provided a slightly smaller proportion of AST than was allocated to them while all other content areas were provided a larger proportion of AST than was allocated to them. Generally, the increase in the proportion of AST provided was very small, however. The increase for Transitions and Breaks was an exception; together the proportional share of AST for these two content areas increased from 18.8 percent to 34.3 percent. The proportional share of all other content areas combined increased only from 64.3 percent to 65.7 percent of AST.

The time which teachers used to increase the proportion of AST for content areas came from two sources: a decrease in the allocated proportion of AST to Reading and Math and from unallocated time. Which source(s) provided the time to increase the proportion of AST of a

TABLE 5.19

Proportion of AST Teachers Allocated and Provided for Content Areas

Content Area	Percent Allocated	Percent Provided
Language Arts	12.7	14.0
Reading	13.3	11.3
Math	12.5	11.4
Science	9.4	10.2
Transitions	1.0	8.8
Breaks	17.8	25.5
Enrichment	16.4	18.8
Unallocated	16.9	—
Totals	100.0	100.0

particular content area cannot be determined however from the data. What is clear is that only a very small part of the overall increase in time for Transitions and Breaks can be attributed to the decrease in the proportion of AST to other content areas. The greatest amount of the increase must be attributed to unallocated time.

A comparison of the data from Table 5.5 with those of Table 5.13 shows that individual teachers generally followed this same pattern. Teacher 5 though did not follow this pattern. (S)he increased about equally the proportion of AST for Reading, Math, Breaks and Transitions.

Several reasons may account for the way in which teachers used unallocated time. Without exception, they failed to anticipate a need for Transitions (they allocated only one percent of AST for Transitions). Since Transitions are an essential activity which facilitate changes from one activity to another, teachers found it necessary to provide time for them. But, why did teachers provide a greater proportion of AST for Breaks than what they had allocated? One reason may be that it was a way for teachers to avoid a possible stressful situation brought about by use of an unplanned activity. If a teacher were to use the unallocated time for an activity in a content area other than Break or Transition, (s)he would have to extend a planned activity beyond the limits of the plan, initiate an unplanned activity or initiate a routine. Any one of these strategies would probably require him/her to hastily arrange for materials, develop or recall instructional methods, ideas and goals, etc. Perhaps teachers believed this approach might disrupt the class and precipitate management problems, thus making their job more difficult. So teachers may have been reluctant to use unallocated time in this way, opting instead to use it most often for a Break. For the most part, Breaks require little or no planning on a teacher's part and practically no use of materials by students. This characteristic of Breaks makes it an ideal activity to use when extra time is available.

It may also be that Breaks are a good opportunity for students and teachers to obtain relief from the pressures of the classroom. Thus, teachers may consistently allow Break time to run beyond its intended length.

Since each teacher provided about twenty-five percent of AST for Breaks, it may be that this is the amount of time teachers and students require during the school day. In this case, teacher failure to allocate about twenty-five percent of AST for Breaks could indicate a lack of understanding of their own as well as students' needs.

Except for Transitions and Breaks then, the proportion of AST teachers provided for each content area was quite similar to the proportion of AST they allocated to them.

A comparison of the findings from Tables 5.4 and 5.12 reveals the same pattern when grade level is considered. The proportion of AST allocated was only slightly different than planned in each grade level. The greatest difference occurred in Transitions and Breaks. The proportional share of AST for each of these content areas was increased by about seven percentage points. In general then, the proportion of AST grade levels provided was quite similar to the proportion planned.

Once a teacher has decided (allocated) then that a certain content area should be provided x percentage of AST, just about x percentage of AST was provided. This suggests a strong relationship exists between a teacher's planned time allocations and the use of time in the classroom.

In the aggregate, how this works out interval by interval is discussed in the next chapter under regressions.

The teacher's planned time allocations functioned then as more than just a loose or sketchy outline of his/her intentions as suggested by Smith and Sendelbach (1979); instead they served as quite specific guidelines for the quantity of time that was to be provided for each content area. The findings of Morine-Dershimer (1977) support this notion.

Thus, the dramatic differences between individual teachers within content areas in the proportion of AST each provided (Table 5.13) may not be explained by differing teacher reactions to differing student behaviors and events in the classroom; rather, teachers' planned time allocations alone may account for the differences (Table 5.5).

Even though the proportion of AST teachers provided to content areas was similar to what they had planned, they often used time differently from the way they had indicated in their plans. A major way teachers departed from their plans was through the use of activities that had not been stated in their written plans. We have called these activities unplanned because they had not been scheduled to occur. (Perhaps some unscheduled activities which occurred were routinized activities, activities which had been previously postponed or activities the teacher was intending to use at a future date; as such then, they were not completely unplanned.) Table 5.20 shows the proportion of time provided in each content area (see Table 5.11 for total time provided) which was used for unscheduled activities. Overall, 36.1 percent of the time teachers provided for activities in the content areas was used in a way not anticipated by the plan.

TABLE 5.20

Proportion of AST Teachers Provided for Activities
Not Stated In Their Plans

Content Area	Actual Activities Not Stated in Plan	Percent
Language Arts	50	35.6
Reading	27	27.8
Math	8	12.8
Science	18	37.6
Transitions	391	93.4
Breaks	120	29.2
Enrichment	48	37.6

Teachers provided the least amount of time for unscheduled Math activities; only about thirteen percent of Math time was used for unscheduled activities. But, in most content areas, over one-third of the classroom time was used for unscheduled activities. For example, of the 2649 minutes teachers provided for Language Arts, 943 minutes was used for unscheduled activities. Teachers used unscheduled activities most often in Transitions; over ninety-three percent of the time teachers provided for this content area was used for unscheduled activities.

A second way in which teachers departed from their plans was by not providing time for some scheduled activities. This practice occurred much less frequently than the one just mentioned; but in terms of time, it accounted for a sizeable departure from allocated time for Science, Transitions and Enrichment. The proportion of allocated time which was not used for activities which had been planned is shown in Table 5.21 (see Table 5.3 for total allocated time). Again, Math was the content area which was affected the least by this teacher practice. Only 4.2 percent of allocated Math time was not used as stated in the plan. The proportion of allocated time for other content areas not used as stated in the plan ranged from 5.5 percent for Breaks to 30.8 percent for Transitions. Overall, about fourteen percent of allocated time was not used as stated in the plan.

So, even though teachers provided about the same proportion of AST to the content areas as they had planned, they sometimes failed to use scheduled activities and often used unscheduled ones.

Teachers' extensive use of unscheduled activities and their frequent failure to use planned activities suggest that a teacher's plan about what specific activities to use does not have a strong effect on what activities occur in the classroom.

TABLE 5.21

Proportion of Planned Time Teachers Did Not Provide For the Content Area Stated in Their Plans

Content Area	Activities Stated In Plan But Not Used	Percent
Language Arts	8	12.5
Reading	14	14.4
Math	3	4.2
Science	14	29.3
Transitions	10	30.8
Breaks	10	5.5
Enrichment	19	20.0

A third way in which classroom use of time differed from the plan was in the number and mean length of the opportunities provided. An examination of Tables 5.6 and 5.14 shows that teachers provided more opportunities than were planned, but opportunities were, on the average, shorter in length than planned.

Perhaps one reason teachers altered their plans in these ways was because a few long opportunities proved too cumbersome in the ebb and flow of classroom life. But, for whatever reason, teachers decided to use shorter and more frequent opportunities.

Teacher 5 was the only teacher who more often than not did not follow this pattern (Tables 5.8 compared with 5.16). Like the other teachers, (s)he provided more opportunities in all content areas (except Science), but in contrast to the other teachers, (s)he provided more time on the average than (s)he had planned to opportunities in Language Arts, Science, Breaks and Enrichment. Perhaps (s)he was more like an incremental planner and made provision for spontaneity in the classroom. Spontaneity might allow for increased teacher/student interactions, resulting in the use of more time for an activity than had been planned.

Science was the only content area for which the planned number of intervals and their average length remained essentially unchanged; teachers provided almost the same number of intervals for Science as they had intended and the average length of the intervals differed by less than one-half minute from what had been allocated. In other words, teachers followed their plans in Science nearly exactly. Smith and Sendelbach reported a similar behavior in the teaching of Science. They theorized that teacher unfamiliarity with the content contributed to a slavish adherence to the plan (Smith and Sendelbach 1979). They also noted that exclusive reliance on prepared curricula materials when planning and while teaching resulted in the teacher being unwilling or unable to alter his/her Science plans in response to student and/or classroom needs. Perhaps this was true of teachers in this study.

Our findings regarding teacher time decisions in content areas other than Science suggest that Smith and Sendelbach's findings regarding rigid adherence to plans should not be generalized beyond the area of Science; perhaps Science is the only content area for which teachers so rigidly follow their plans.

The fourth way in which teachers' classroom use of time differed from the plan was in the variance of planned and observed intervals. The standard deviations of planned and observed (opportunities) intervals are compared in Table 5.22. In some content areas, opportunity variance was greater than the planned variance. This was true for Math, Breaks and Enrichment. In other content areas, variance was less. Over all teachers though, the differences between planned and opportunity variance within content areas were not too large; all differences fall within the range of .1 - 5.7 minutes.

TABLE 5.22

Standard Deviations of Teachers' Planned Intervals and Opportunities for Content Areas

Content Area	Planned SD	Opportunity SD
Language Arts	27.9	22.2
Reading	22.3	19.3
Math	23.2	24.7
Science	14.8	14.7
Transitions	5.4	2.8
Breaks	14.0	16.8
Enrichment	18.9	20.4

What this finding suggests is that opportunity variance is a planned event and not a consequence of classroom content or student needs; it is another measure that indicates that teachers quite rigidly follow their planned time allocations.

But, when planned and opportunity variance of individual teachers are compared within content areas (Table 5.23), we see that the variance within some content areas hardly differed at all, while the variances in other content areas differed substantially.

These findings suggest two conclusions: (1) when planned variance differs substantially from opportunity variations, then teachers

TABLE 5.23

Comparison of Standard Deviations of Planned Intervals With Intervals (Opportunities) Provided by Teacher.

Content Area	Teacher 1		2		4		3		5		6	
	SD#	SD*	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Language Arts	43.8	31.7	27.2	14.1	7.1	14.9	10.4	10.8	26.0	28.2	16.7	18.6
Reading	7.1	9.7	22.7	10.8	17.6	18.0	19.0	6.9	30.6	29.0	16.9	8.4
Math	—	—	32.9	33.2	3.7	19.8	13.5	3.2	2.4	15.2	9.6	10.3
Science	16.6	17.7	32.0	15.9	6.1	0.7	6.3	10.8	10.6	7.5	14.7	20.3
Transitions	—	2.7	2.9	2.8	2.4	2.3	—	2.7	8.3	4.2	5.8	2.0
Breaks	14.0	18.6	18.8	18.3	13.2	19.9	7.4	14.7	11.1	10.4	11.5	14.3
Enrichment	16.1	17.4	15.8	18.0	20.9	14.9	12.0	19.4	18.6	17.3	16.9	21.2

#standard deviations of planned intervals

*standard deviations of intervals (opportunities) provided use of time in the classroom may have been quite strongly influenced by events in the classroom rather than by the plan; and (2) when planned variance does not differ or differs only minimally from opportunity variance, then teachers use of time in the classroom may have been quite strongly influenced by the plan.

Summary of Comparisons

A comparison of planned time allocations with actual time allocations revealed that:

(1) The proportional share of AST for all content areas other than Transitions and Breaks increased less than two percent, i.e, in the aggregate, the amount of time teachers provided for content areas was similar to time they had planned;

(2) The proportional share of AST for Transitions and Breaks increased from 18.8 percent to 34.3 percent;

(3) Teachers use of time in the classroom differed in four ways from their planned use:

(a) 36.1 percent of AST was used for unplanned activities;

(b) about 14 percent of allocated time was not used as stated in the plan;

(c) teachers provided more and shorter classes than they had planned;

(d) the lengths of classes within some content areas differed from the plan: in some content areas, the lengths of classes were more alike than planned while in other content areas, the lengths were more diverse than planned; differences between planned and opportunity variance were quite small, however.

CHAPTER 6

COMPARISON OF REGRESSION MODELS WITH THEORETICAL MODELS

Introduction

In this chapter, teacher time decision patterns as described by regression models will be presented and compared to the theoretical models described in Chapter 4. Teacher time decision patterns as described by regression models will also be presented for each of three content areas (Language Arts, Reading, Math).

Pearson Correlation

In Chapter 4, theoretical relationships between hypothetical planned and actual time allocations were proposed. An assumption underlying these theoretical models is that a high positive association exists between teachers' planned and actual time allocations. To confirm whether such an association did exist between planned and actual time allocations of teachers in our study, Pearson correlation analyses were performed on the sample data. Results of these analyses are shown in Table 6.1.

From Table 6.1 we can see that the correlations differed substantially across teachers. Differences imply that any effect planned time allocations might had on allocations of time in the classroom was much stronger for some teachers than for others. (Correlations between planned and actual time allocations will be written as P/A correlations.)

We grouped the correlations into three categories: high, moderate and low. High correlations are defined as those between .70 - 1; moderate correlations are defined as those between .59 - .69; and low correlations are defined as those less than .59.

Table 6.1

Pearson Correlations Between All Planned Time Allocations and Actual Time Allocations by Teacher

Teacher	r	n
1	.75	186
2	.79	185
3	.76	223
4	.55	170
5	.65	141
6	.40	196

High P/A correlations suggest that a relatively strong relationship existed between a teacher's planned and actual time allocations. With a high P/A correlation, variations in actual time allocations followed rather closely variations in planned time allocations. A high P/A correlation indicates then that the time a teacher provided for planned activities was quite similar to the time (s)he had planned for them. The P/A correlations of Teachers 1, 2 and 3 were high.

Moderate P/A correlations suggest that the amount of time a teacher provided for planned activities often differed from the time (s)he had planned for them; but, actual time allocations tended to vary in a similar fashion as planned time allocations. The P/A correlation of Teacher 5 was moderate.

A low P/A correlation suggests that a very weak relationship existed between a teacher's planned and actual time allocations: variations in actual time allocations most often did not follow variations in planned time allocations. In other words, time provided for activities differed almost randomly from time allocated to them. Teachers 4 and 6 were the only teachers who had low P/A correlations.

The correlations of planned and actual time allocations of only three teachers then were found to be in the high range. Based on earlier studies which found that teachers most often adhered to their plans (Peterson and Clark 1978; Morine and Vallance 1975; Morine-Dershimer 1979; Zahorik 1970; Smith and Sendelbach 1979), we are somewhat surprised that only one-half of the sample in our study had correlations which indicate a fairly strict conformity to plans. The fact that three teachers had correlations in the low to moderate range indicates that a strong association between a teacher's plans and his/her classroom practice may not describe typical teacher practice; in fact, our correlational findings indicate that some teachers regularly departed substantially from their plans. Perhaps these were teachers who, like some teachers in the Peterson and Clark (1978) study, were concerned more with instructional processes in their planning and as a result, were more inclined to change to alternative activities if instruction was not proceeding according to plan.

Regression Models of Teacher Time Decision Patterns

We hypothesized that a positive relationship between a teacher's planned and actual time allocations (we refer to this relationship as a teacher's "time decision pattern") could be summarized by one of six different theoretical models. Five of the models are linear and one is a linear model whose regression line becomes asymptotic to the x-axis. To determine whether or not these theoretical models are appropriate for describing a teacher's time decision pattern, we submitted the data to regression analyses using a linear regression model.

The regression models which resulted were then compared with the theoretical models at two different levels. First, the regression models which described a teacher's typical time decision pattern were compared with the theoretical models. Second, the regression models which described a teacher's time decision pattern for each of three content areas were compared with the theoretical models; the three content areas were Language Arts, Reading and Math.

From regression analyses, two types of deviations can be identified: one is the deviation of the best fitting model from Theoretical Model 3 ($\beta_0 = 0$; $\beta_1 = 1$). Our discussion of this kind of deviation will focus on the deviation of b_1, from β_1 of Model 3.[1] Such deviations explain how a teacher's actual time allocations differed in general from what (s)he had planned, e.g., whether (s)he typically lengthened short planned time allocations and shortened long ones. The difference between the slope of the regression line which summarizes a teacher's time decision pattern and the slope of the logical model determines which theoretical model is appropriate for describing his/her time decision pattern.

The other kind of deviation was of a teacher's actual time allocation from the time allocation predicted by the best fitting model, i.e., $(y - \hat{y})$. Deviations of this kind explain an individual teacher's idiosyncratic behavior when contrasted to the best fitting theoretical model. When discussing deviations of this nature, we will focus on deviations of selected planned time allocations from time predicted by the best fitting model. The typical way in which a teacher modified

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[1]The value of b_1 would be 1 if a teacher's time decision pattern comformed perfectly on the average to Model 3, the logical model.

his/her planned time allocations we will refer to as his/her "plan modification pattern."

Through regression analyses, we found that the association between the planned and actual time allocations for each of the six teachers in our study was a positive linear one. And, the regression model for each teacher was very similar to Theoretical Model 6. Model 6 describes the decrease interaction relationship. Regression coefficients for this theoretical relationship are $\beta_0 > 0$ and $\beta_1 > 0 < 1$. An example of a regression line for this model is shown in Figure 6.1.

All teachers in this study then, deviated from the logical model (Theoretical Model 3) in the same way. Thus, we conclude that their time decision patterns were similar.

Regression coefficients for the regression model which describes the association between each teacher's planned and actual time allocations appear in Table 6.2. As can be seen, all of these regression values conform to the regression values of Theoretical Model 6. Since none of the confidence intervals for the regression coefficients $\hat{\beta}_0$ shown in Table 5.24 include zero and none of the confidence intervals for $\hat{\beta}_1$ include one, we are ninety-five percent confident that b_0 and b_1 are not equal to zero and one respectively. Thus, we are quite certain that the regression model for each teacher accurately describes his/her time decision pattern. Regression lines for these empirical models are shown in Figure 6.2.

Because the regression model of each teacher's time decision pattern closely resembles Model 6, it follows that each teacher's plan modification pattern was very similar to the theoretical pattern. But, as will be seen later, some observed intervals (opportunities)

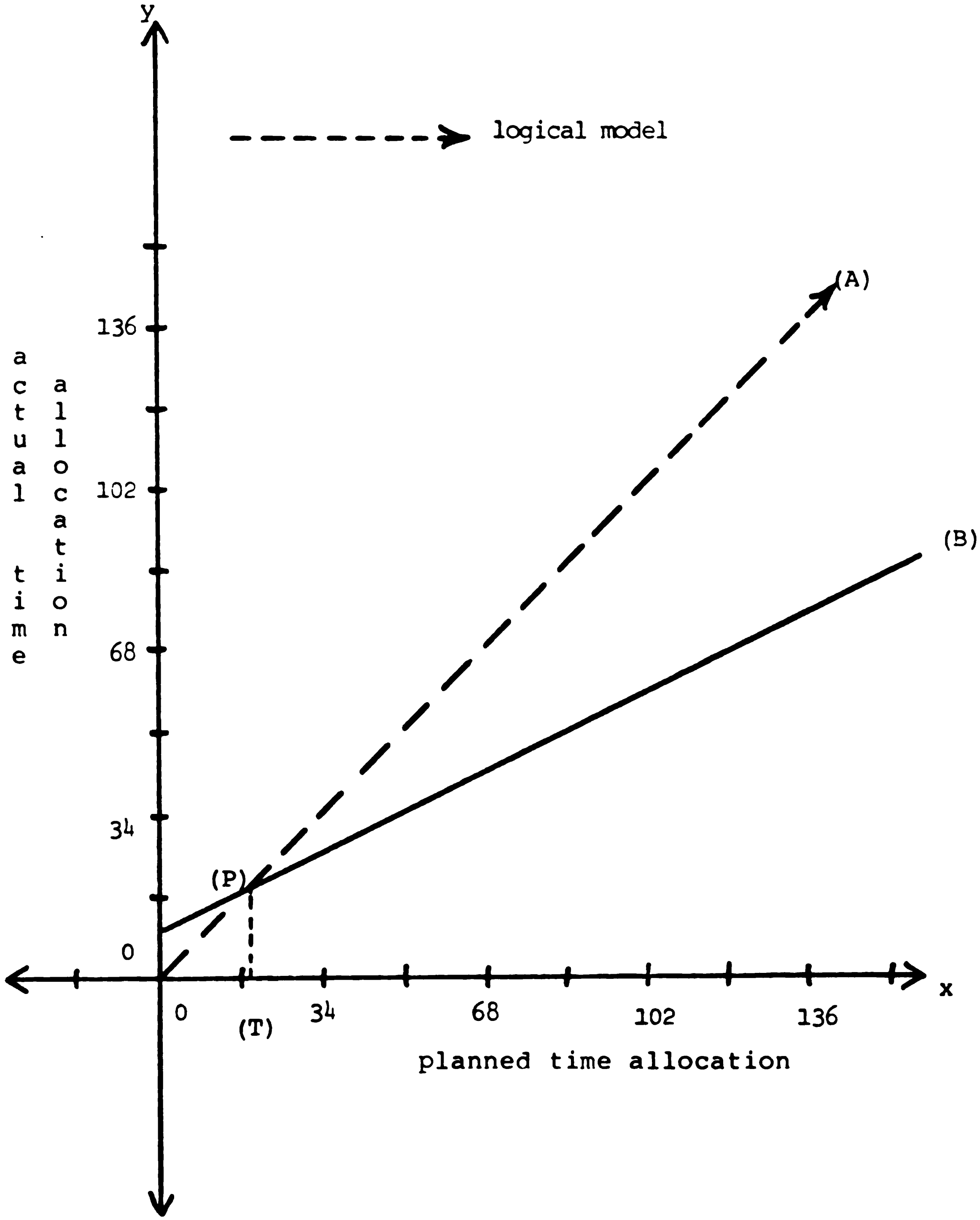

Figure 6.1

Regression Line Summarizing Theoretical Model 6

Table 6.2
Regression Coefficients and 95% Confidence Intervals by Teacher

Teacher	b_o*	b_1*	95% Confidence Interval $\hat{\beta}_0$	$\hat{\beta}_1$
1	10.44	.65	8.15 - 12.73	.56 - .73
2	8.38	.60	6.17 - 10.60	.54 - .67
3	5.13	.72	3.53 - 6.74	.64 - .80
4	8.33	.52	5.28 - 11.37	.41 - .64
5	11.03	.62	7.32 - 14.86	.50 - .74
6	11.37	.38	8.45 - 14.29	.26 - .51

*all significant at $p < .0$

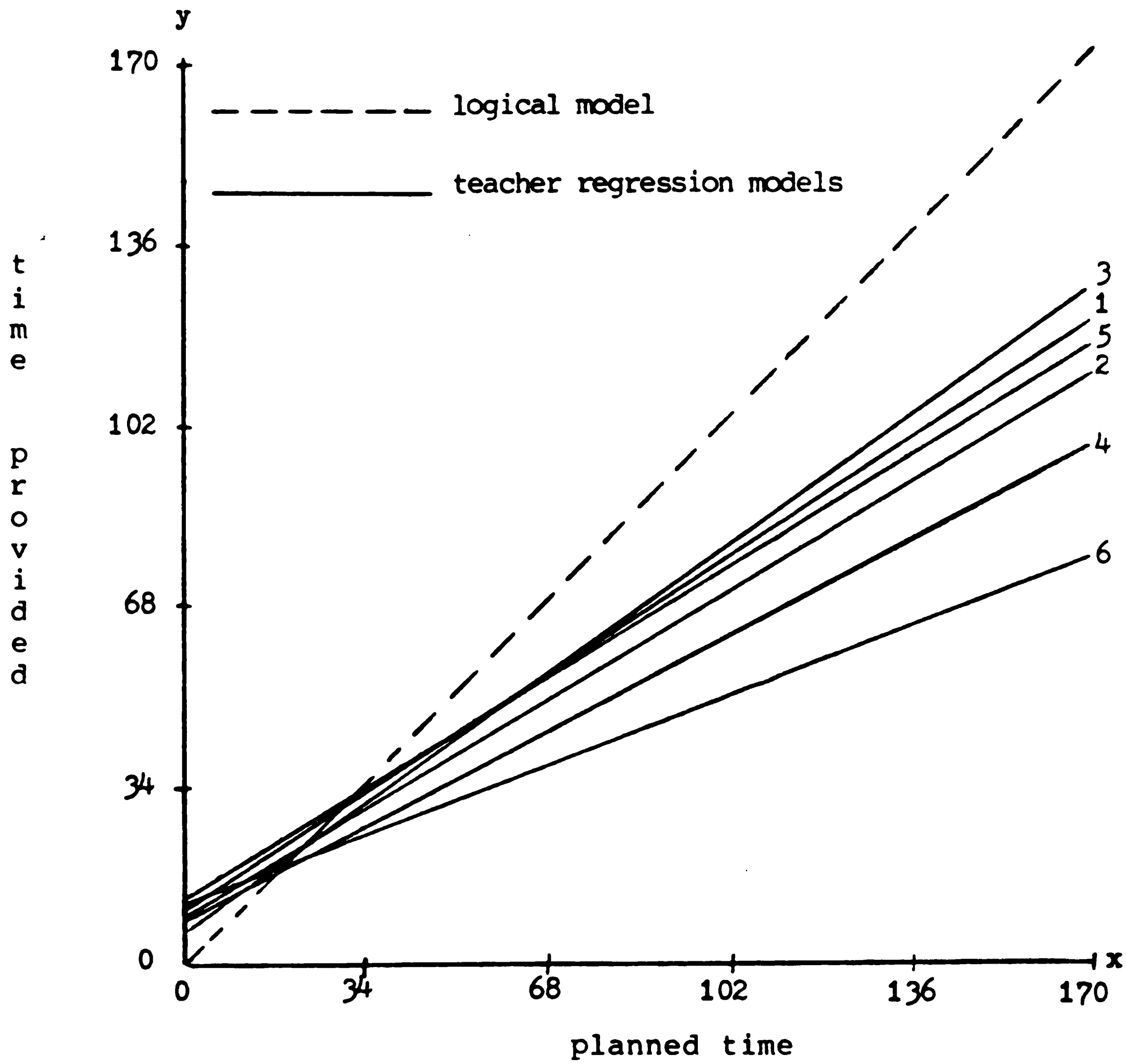

Figure 6.2

Regression Models of the Time Decision Patterns
of Participating Teachers

appear in areas around each regression line where they are not expected. The non-typical placement of opportunities around the regression lines differed across teachers. This suggests that teachers occasionally modified their planned time allocations differently from the theoretical pattern as well as from each other. The way in which each teacher modified his/her planned time allocations and the regression model which describes each teacher's time decision pattern will be discussed in the following sections.

Teacher 1

An examination of the scatter plot in Figure 6.3 for the sample data of Teacher 1 reveals a definite linear trend between his/her planned and actual time allocation. But, we can see that many of his/her actual time allocations deviated from times predicted by the logical model: (s)he shortened the planned time allocations of many planned activities, but (s)he also lengthened a number of them. Activities with planned time allocations of zero and fifty-one to sixty-eight minutes deviated from the logical model by the greatest amount of time. The planned time allocation of other activities typically deviated from the logical model by only a small amount of time. In general, the actual time allocation for only a few of Teacher 1's 186 activities closely followed the logical model.

It appears that Teacher 1's general plan modification pattern was to provide less time for planned activities with long planned time allocations and to provide more time for activities with the shortest planned time allocation. Such a plan modification pattern conforms to the theoretical plan modification pattern of Model 6.

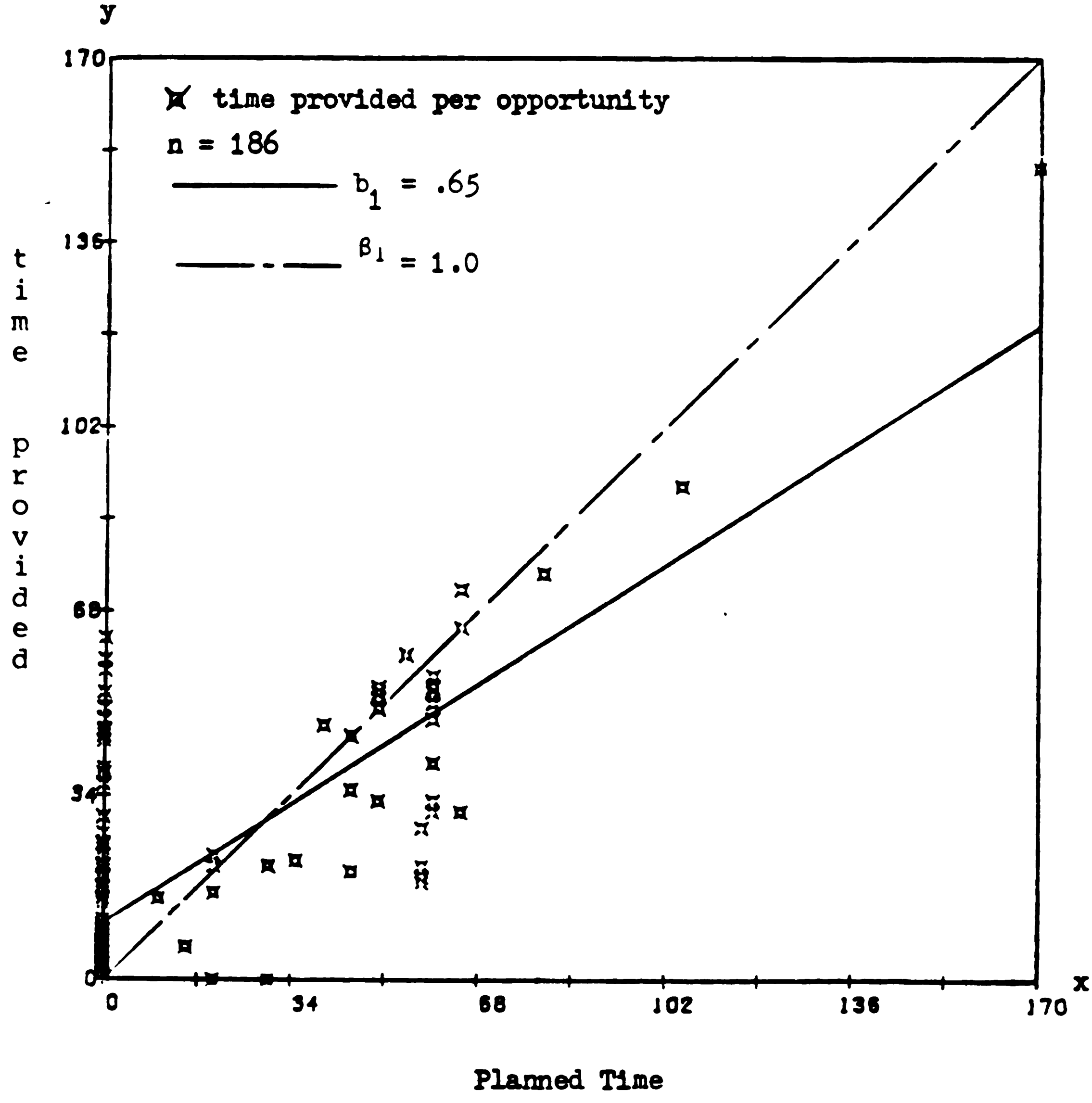

Figure 6.3

Regression Model for Teacher 1's Time Decision Pattern

The regression line in Figure 6.3[2] summarizes the "best fitting" time decision pattern for Teacher 1; it conforms to Theoretical Model 6. Its high slope (.65) indicates a fairly strong linear time decision pattern. In this pattern, variations in actual time allocations tended to follow rather closely variations in planned time allocations. In other words, Teacher 1's actual time allocations were similar in length to their corresponding planned time allocations.

A measure of this similarity is the "slope difference". Slope difference is the difference between the slope of the logical model (1) and that of the regression model. The larger the difference, the more dissimilar on the average actual time allocations were from planned time allocations. For Teacher 1, the deviation of the slope of his/her time decision pattern from the slope of the logical model was (.35); this indicates that in general, Teacher 1 provided about one-third less time for planned activities than (s)he had allocated to them. Since the slope difference is not large, i.e., not more than .5, we conclude that Teacher 1's time allocations had a fairly strong effect on his/her actual time allocations.

In some cases, however, the time Teacher 1 provided for activities deviated substantially[3] from the time predicted by this model. Deviations were especially large for planned time allocations of zero

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[2]It appears that the number of observed intervals plotted in this and subsequent figures is less than n. This is because the coordinates of some observed intervals are identical. This plot as well as the following ones were analyzed and found to be the result of the given n.

[3]We considered any actual time allocation that differed by at least one-half from the time predicted by the model to be in great or substantial deviation from the predicted model.

and those between seventeen and sixty-eight minutes. The largest deviations from the regression model occurred, however, with activities whose planned time allocations were zero. The model indicates that unplanned activities received an average of about 10.5 minutes; some of them, however, were provided more than five times this amount of time. But, since the average unplanned activity was only 10.5 minutes, long unplanned activities were the exception; by far the greatest number of unplanned activities were of very short duration. Unplanned activities then were probably transition or management type activities.

Large deviations also occurred for activities with planned time allocations of between seventeen to thirty-four and fifty-one to sixty-eight minutes. The time Teacher 1 provided for some activities with planned time alloctions between fifty-one and sixty-eight minutes deviated from the predicted model by nearly twenty-nine minutes while the time (s)he provided for several activities with planned time allocations between seventeen and thirty-four minutes deviated from the regression model by about twenty-five minutes. The amount of time Teacher 1 provided for most other activities also deviated from the time predicted by the model, but not by such large margins.

The extent of deviation from the regression model for planned activities appears to have been dependent upon whether the deviation resulted in more or less time being provided than was predicted by the model. Typically, if Teacher 1 provided less time than predicted, the deviation was quite large. But, if (s)he provided more time than predicted, the deviation was quite small. The exception to this plan modification pattern was unplanned activities.

Teacher 2

An examination of the scatter plot in Figure 6.4 for the sample data of Teacher 2 reveals a definite linear trend between his/her planned and actual time allocations. But, many of Teacher 2's actual time allocations deviated from the logical model; for many activities, Teacher 2 provided less time than (s)he had intended while for others, (s)he provided more time. In only a few instances did Teacher 2 provide the amount of time (s)he had intended. Overall, the scatter plot indicates that Teacher 2 tended to increase the length of short planned time allocations and decrease the length of long ones. This plan modification pattern conforms to the plan modification pattern of Model 6.

The "best fitting" regression line which summarizes the time decision pattern of Teacher 2 is graphically depicted in Figure 6.4. It indicates that the time decision pattern was linear; it conforms to Theoretical Model 6. The slope (.60) suggests that variations in actual time allocations tended to follow variations in planned time allocations. This finding suggests that Teacher 2's planned time allocations had an effect on his/her actual time allocations.

The slope deviates from the logical model by (.4). This slope difference indicates that on the average, Teacher 2 shortened planned time allocations by forty percent. In general then, the length of an activity tended to be similar to its planned length.

Actual time allocations for many activities deviated significantly from this regression model, however. Deviations were especially large for activities with planned time allocations of zero, those with planned time allocations between zero and seventeen minutes and those with planned time allocations between forty and eighty-five minutes.

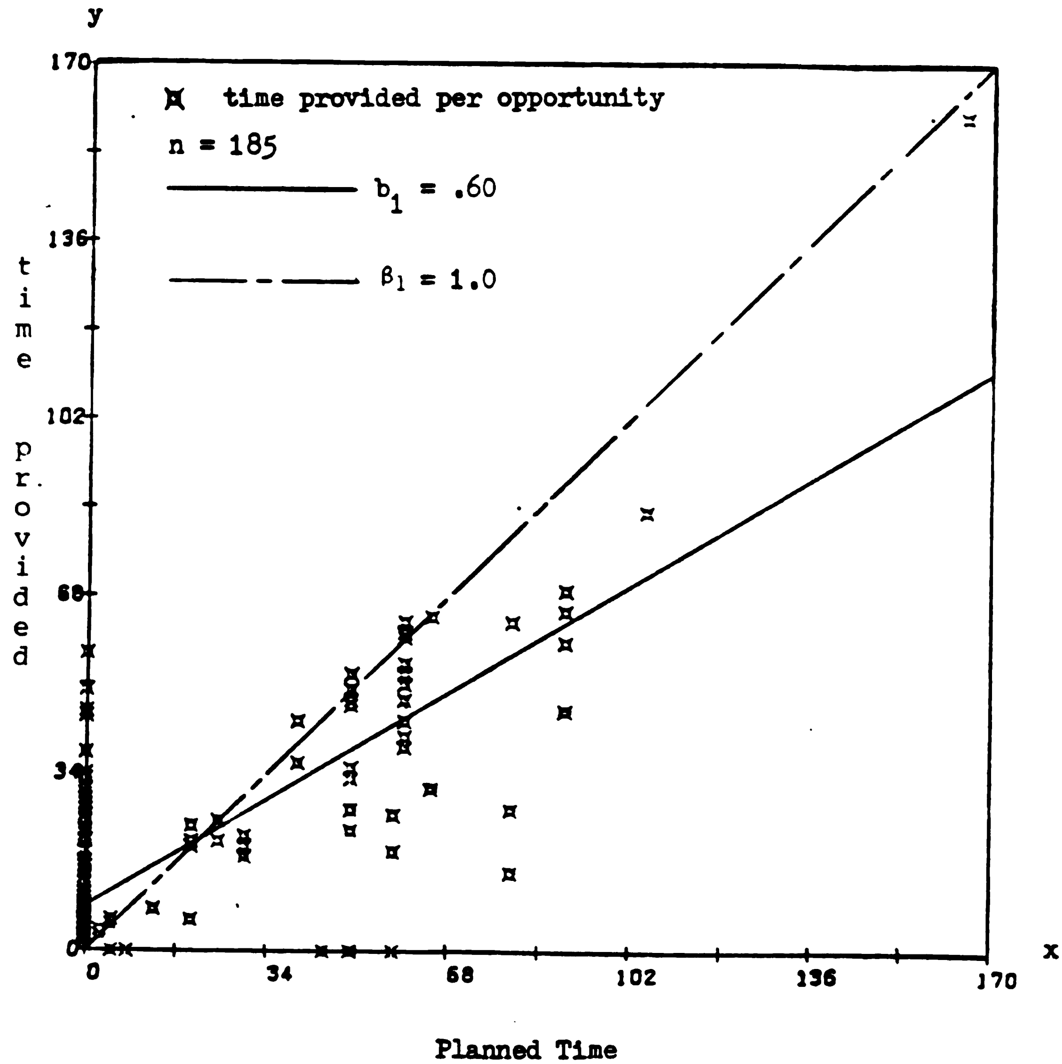

Figure 6.4

Regression Model for Teacher 2's Time Decision Pattern

The regression model shows that unplanned activities (zero planned time allocations) averaged about 8.5 minutes. Many unplanned activities were provided less time than this, but some were provided much more than 8.5 minutes; several were provided more than three times more time than indicated by the model. The short average length of unplanned activities indicates, however, that most of them were very short, probably transition or management activities.

All of the activities with planned time allocations between zero and seventeen minutes were provided much less time than is shown by the regression model. The model predicts that activities in this time range should have been provided between eight and sixteen minutes; instead, none was provided more than four minutes.

The time Teacher 2 provided for most planned activities with planned time allocations between seventeen and thirty-four minutes did not deviate greatly from the predicted model.

The amount of time Teacher 2 provided for a number of activities with planned time allocations between forty and eighty-five minutes was considerably different than what is predicted by the model. For example, the model predicts that activities with a planned time allocation of fifty-one minutes should have been provided about thirty-five minutes; but one of the activities in this time range was provided no time, while several others were provided about fifty-one minutes. The same pattern of deviation occurred with activities which had planned time allocations of about sixty minutes: some were provided much less time than was predicted for them while some were provided much more time than was predicted.

The pattern of deviation is slightly different for activities with planned time allocations above sixty minutes. Several of these activities were provided about the same amount of time predicted for them while others were provided much less time than was predicted.

In general then, the way in which Teacher 2's actual time allocations deviated from the regression model differed for different planned time allocations. Activities with short and long planned time allocations were generally much shorter than predicted by the model. The time provided for activities with planned time allocations between the longest and shortest planned time allocations was much greater than predicted for some activities and much less than predicted for others.

Teacher 3

The scatter plot of Teacher 3's actual time allocations is shown in Figure 6.5; it reveals a strong linear trend between his/her planned and actual time allocations. Most of his/her time allocations deviated from the logical model, however. For some activities, (s)he provided more time than (s)he had planned. This kind of deviation occurred with unplanned activities as well as a number of planned activities. It appears though that many of the activities were provided less time than was planned for them.

The deviations of Teacher 3's actual time allocations from the logical model is summarized by the "best fitting" regression line shown in Figure 6.5. The regression line indicates that his/her time decision pattern was linear and conforms to Theoretical Model 6.

The slope of the regression line is .72. A slope of this magnitude implies that variations in actual time allocations very closely followed variations in planned time allocations.

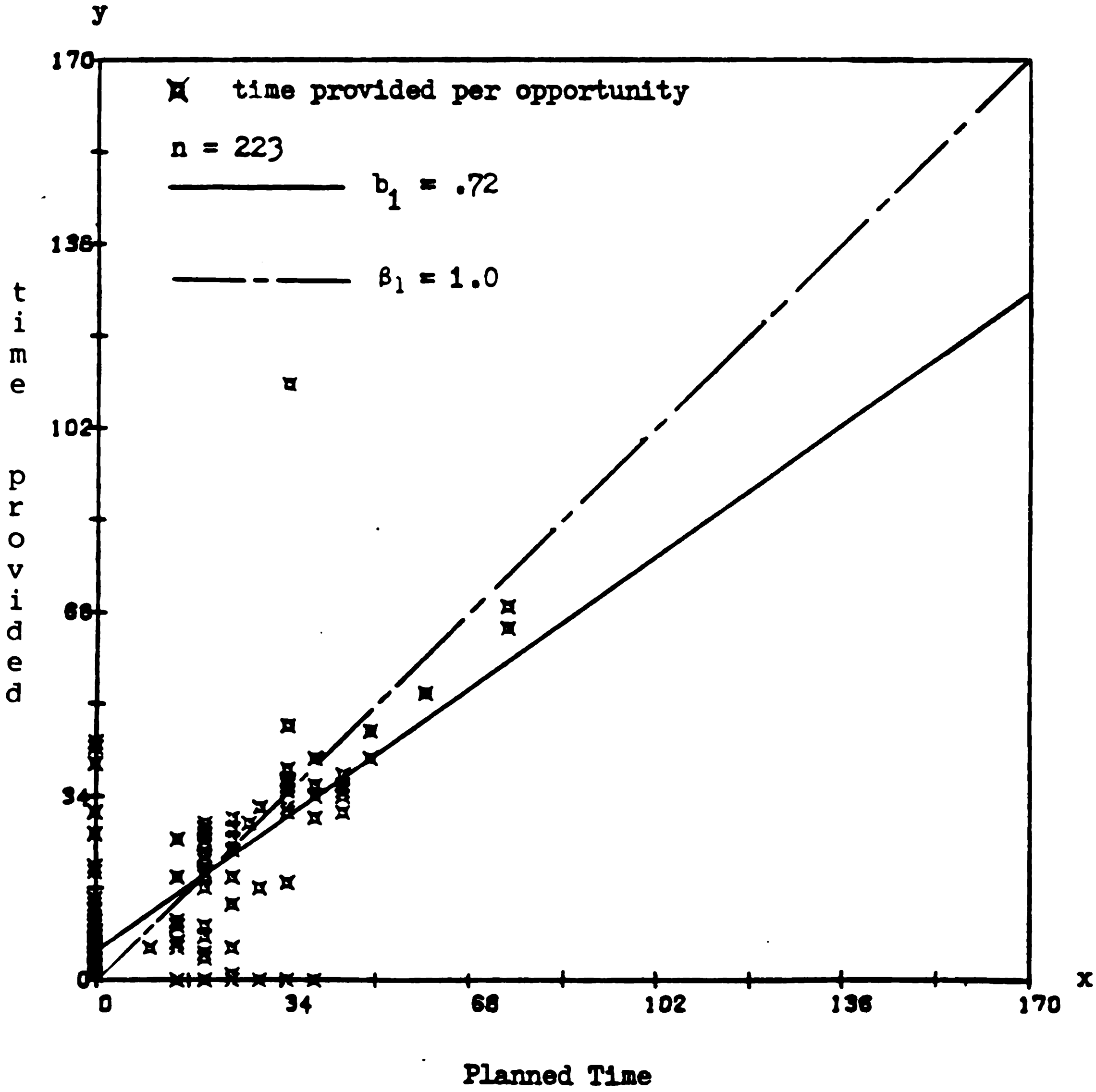

Figure 6.5

Regression Model for Teacher 3's Time Decision Pattern

The small deviation of the slope (.28) from the logical model indicates that on the average Teacher 3 shortened planned time allocations, but only by a small amount of time. A .28 deviation from the logical model suggests that planned time allocations were shortened on the average by twenty-eight percent. Frequently then, the time Teacher 3 provided for activities did not differ all that much from his/her planned time allocations. Thus, we conclude that his/her actual time allocations were significantly influenced by his/her planned time allocations.

Teacher 3 did not modify all planned time allocations in the way suggested by the regression model. The amount of time (s)he provided for many unplanned activities and several activities which were planned to last between seventeen and forty minutes deviated greatly from the time predicted by the model.

From the regression model shown in Figure 6.5 we determine that unplanned activities are predicted to last about five minutes; but, quite a few of them lasted longer than this and several lasted somewhat longer than seventeen minutes. But, since unplanned activities averaged only five minutes, by far the greatest number of unplanned activities were of very short duration. Several activities with planned time allocations between seventeen and forty minutes were provided much less time than was predicted by the model. The regression model predicts that activities with these planned time allocations should be provided from about sixteen to thirty-three minutes. Instead, a number of them were provided five minutes or less and some were provided no time at all. Only one activity with a planned time allocation between seventeen and forty minutes was provided an amount of time which greatly exceeded the time predicted by the model: this activity was provided about seventy minutes more time than what the model predicted it should receive.

The time provided for activities with other planned time allocations deviated from the time predicted by the model, but only by a small amount of time.

Teacher 3's time decision pattern then is characterized by large deviations from the predicted model for activities with short and middle range planned time allocations. The deviations are typically greater than predicted by the regression model for activities with the shortest planned time allocations and both greater and lesser than predicted by the regression model for activities with middle range planned time allocations.

Teacher 4

A scatter plot of the actual time allocations made by Teacher 4 is shown in Figure 6.6. It reveals that often (s)he was not very systematic in the way (s)he modified long planned time allocations: sometimes (s)he shortened long planned time allocations while at other times, (s)he lengthened them. It is somewhat difficult to picture a linear trend from the scatter plot because many of the points on the plot are quite widely scattered. Visual analysis then of the scatter plot does not clearly indicate a linear relationship between Teacher 4's planned and actual time allocations.

Teacher 4 was most inconsistent in how (s)he modified planned time allocations which were between seventeen and sixty minutes: (s)he shortened about as many as (s)he lengthened. His/her modification of short planned time allocations followed a similar pattern; but, often the lengths of short planned time allocations were not modified to the

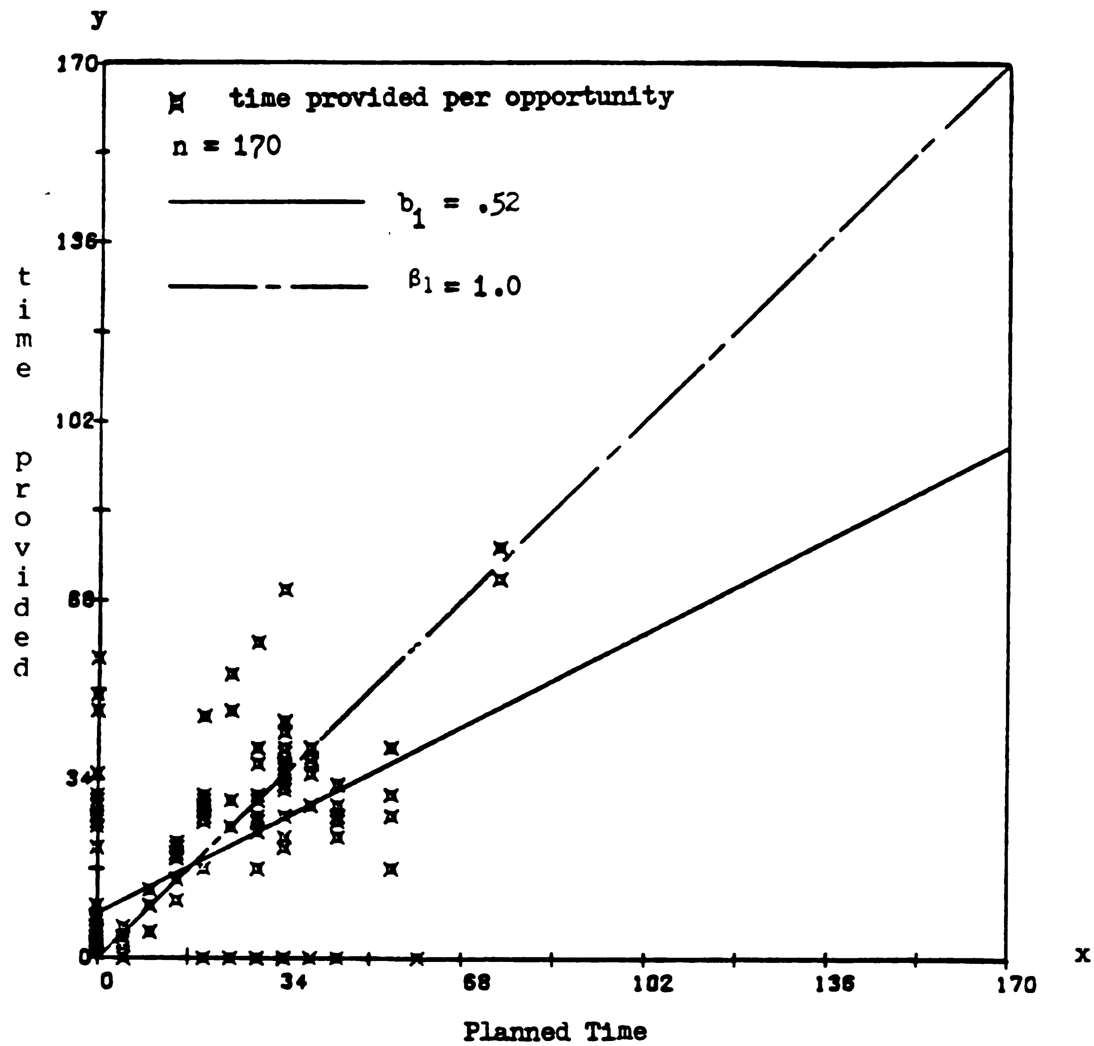

Figure 6.6

Regression Model for Teacher 4's Time Decision Pattern

extent that long ones were.

Teacher 4's modifications often resulted in actual time allocations which deviated from the logical model by a wide margin. The greatest deviations from the logical model occurred with activities which had planned time allocations of zero or seventeen to sixty minutes. The model shows that unplanned activities (those with zero planned time allocations) deviated from the logical model by an average of eight minutes. The time provided to some unplanned activities deviated from the logical model by much less time than this while quite a few others deviated from the logical model by more than nineteen minutes. But, as previously noted, the short average length of unplanned activities indicates that most of them were very short.

In some cases, the time Teacher 4 provided to activities with planned time allocations between seventeen and sixty minutes deviated from the logical model by more than two times. For instance, some activities with planned time allocations of thirty-four minutes were provided no time, while others were provided more than sixty-eight minutes. Other activities in this planned time allocation range deviated from the logical model in this same way. The time Teacher 4 provided to activities with planned time allocations between zero and seventeen and over sixty minutes did not deviate from the logical model nearly as much as this.

In general, the way Teacher 4 modified planned time allocations resembles the plan modification pattern suggested for Model 6, e.g., lengthen short planned time allocations and shorten long ones. But the way in which (s)he modified some planned time allocations resembles the time decision pattern of other models. For instance, the way

Teacher 4 modified planned time allocations between seventeen and sixty minutes in length was more like the plan modification pattern of Model VIII. In a Model VIII time decision pattern, actual time allocations deviate randomly from the logical model. Teacher 4's modification of several other planned time allocations resembles the plan modification of Model 3. In this model, the time provided on the average to activities equals the time predicted by the logical model. This plan modification pattern appears to have occurred with planned time allocations of about four, seventeen, twenty-seven and seventy-seven minutes. Teacher 4's plan modification pattern differed then, for different planned time allocation lengths.

The deviation of Teacher 4's actual time allocations from the logical model is summarized by the "best fitting" regression line shown in Figure 6.6. Its slope (.52) indicates that (s)he followed a linear time decision pattern which conforms to Theoretical Model 6. But, the small size of the slope suggests that variations in actual time allocations followed variations in planned time allocations in a limited way. The slope deviates from the logical model by .48. This indicates that in general, Teacher 4 shortened planned time allocations by almost one-half. Apparently then, Teacher 4's actual time allocations were not greatly influenced by his/her planned time allocations.

Teacher 4's actual time allocations deviated considerably from the regression model. Consider activities with planned time allocations of thirty-four minutes. The model predicts that they should have been provided about twenty-seven minutes; instead, at least one of them was not provided any time at all and several were provided in excess of sixty-eight minutes. A very similar pattern of wide and unsystematic deviation from the time predicted by the model occurred with activities which had planned time allocations between seventeen and seventy-seven minutes.

Several activities with planned time allocations between zero and seventeen minutes also deviated considerably from the regression model. The model predicts that these activities should have been provided between nine and seventeen minutes; several of them, however, were provided five or less minutes while several were provided nearly twenty-four minutes.

In conclusion then, the way in which Teacher 4's time allocations deviated from the regression model differed depending upon the planned time allocation of the activity. For some planned time allocation ranges, deviations followed a consistent pattern and for other planned time allocation ranges, the deviations appeared to be more random.

Teacher 5

The scatter plot of Teacher 5's actual time allocations is shown in Figure 6.7. It shows that some of his/her actual time allocations deviated a great deal from time predicted by the logical model, while the deviation of others was quite small. A linear trend between planned and actual time allocations is apparent, however.

In many ways, the pattern of deviation follows rather closely the theoretical plan modification pattern of Theoretical Model 6: short planned time allocations were lengthened; middle length ones were both lengthened and shortened, and long ones were shortened. On occasion, however, the pattern of deviation is more like the theoretical plan modification pattern of a Model 3 relationship. In such a relationship, the deviations on the average do not differ from the logical

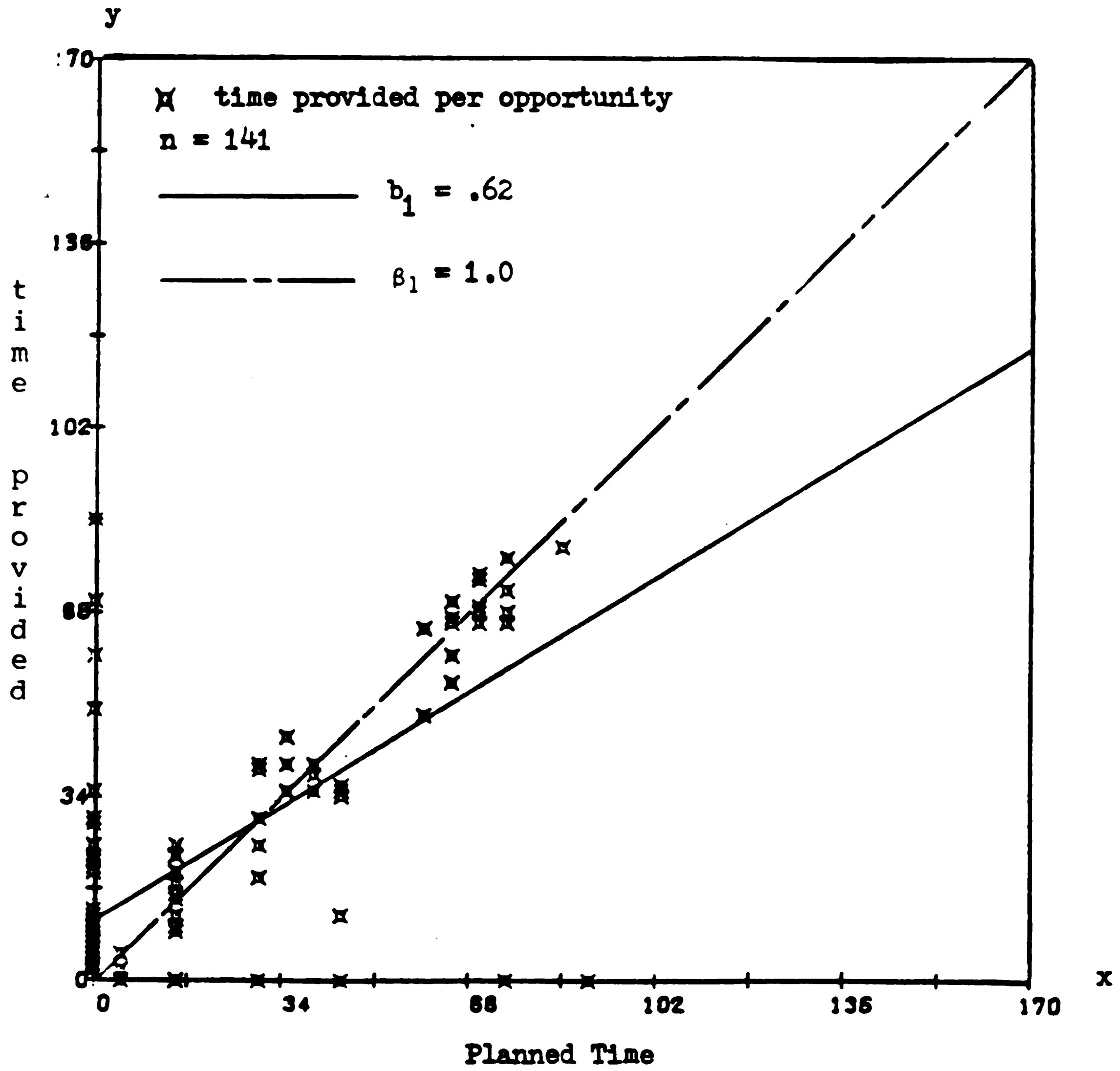

Figure 6.7

Regression Model for Teacher 5's Time Decision Pattern

model. Actual time allocations which fit this pattern of deviation fall just above and just below the broken line in Figure 6.7, the regression line of a Model 3 time decision pattern. Their position on the scatter plot indicates that some of them were a little longer than planned and some were a little shorter than planned.

The "best fitting" regression line in Figure 6.7 summarizes the deviation of Teacher 5's actual time allocations from his/her planned time allocations. Its slope (.62) indicates that Teacher 5's time decision pattern was linear and conforms to Theoretical Model 6.

Because the slope is quite high, we conclude that variations in his/her actual time allocations were quite similar to variations in his/her planned time allocations. A measure of the similarity is the difference between the slope of the regression model and that of the logical model. The deviation of the slope from the logical model is .38, suggesting that on the average, planned time allocations were shortened by about thirty-eight percent. In other words, planned and actual time allocations were on the average quite similar. Thus, it appears that Teacher 5's planned time allocations had an effect on his/her actual time allocations.

From the scatter plot, we can see that many of Teacher 5's actual time allocations deviated considerably from the regression model. The greatest deviations from the regression model, both in terms of number and size, occurred with unplanned activities (activities with unplanned time allocations of zero) and activities with planned time allocations between sixty-eight and ninety minutes. Large deviations also occurred with activities with planned time allocations between five and forty-five minutes; but the frequency of large deviations in this time range was very low.

The regression model indicates that unplanned activities were provided an average of 11.03 minutes. Many unplanned activities though were provided much less time than this, while several others were provided more than three times the average; at least two unplanned activities were provided over sixty-eight minutes, or more than six times the average.

The model indicates that the actual time for activities with planned time allocations between sixty-eight and ninety minutes averaged between fifty-three and sixty-five minutes. But, all the activities with planned time allocations in this range deviated from this predicted time; most of them were provided about fifteen to twenty-five minutes more than the model predicted they should have been provided. Only a few were provided less time than predicted. In both cases, these activities were not provided any time at all; as a result, one of them deviated from the regression model by about seventy minutes and the other by about ninety minutes.

Several other activities which had planned time allocations between five and forty-five minutes were provided much less time than indicated by the model. The model indicates that activities with these planned time allocations were provided an average of about eleven to thirty-five minutes. A number of activities in this planned time allocation range were not provided any time at all, however. Thus, their deviations from the regression model ranged from eleven to thirty-five minutes. Other activities with planned time allocations between five and forty-five minutes had actual time allocations which deviated from the predicted model, but the deviations were somewhat smaller.

In summary, Teacher 5's actual time allocations deviated from the regression model in three general ways: the time provided to a number of unplanned activities was much greater than the average indicated by the model; the time provided to most activities with planned time allocations between sixteen and forty-five minutes was not too much larger or smaller than the average indicated by the model; and the time provided to most of the activities with planned time allocations between sixty-eight and ninety minutes was somewhat greater than the mean time indicated by the model.

Teacher 6

In Figure 6.8, the scatter plot of Teacher 6's actual time allocations is shown. It shows that many of Teacher 6's actual time allocations deviated from the logical model in a pattern similar to that of Teacher 5. Thus, their plan modification patterns were apparently similar. The two teachers differed, however, in the number of instances in which an actual time allocation deviated from the logical model. A comparison of the two scatter plots indicates that Teacher 6's actual time allocations deviated from the logical model by a large margin more often than did the allocations of Teacher 5. This is especially evident with activities that were not provided any time at all (those along the x-axis) and unplanned activities which were provided much more time than anticipated in the plan. In addition, the time Teacher 6 provided to activities with long planned time allocations (between thirty-four and sixty-eight minutes) deviated substantially from the logical model, whereas large deviations from the logical model occurred infrequently with Teacher 5. On the other hand,

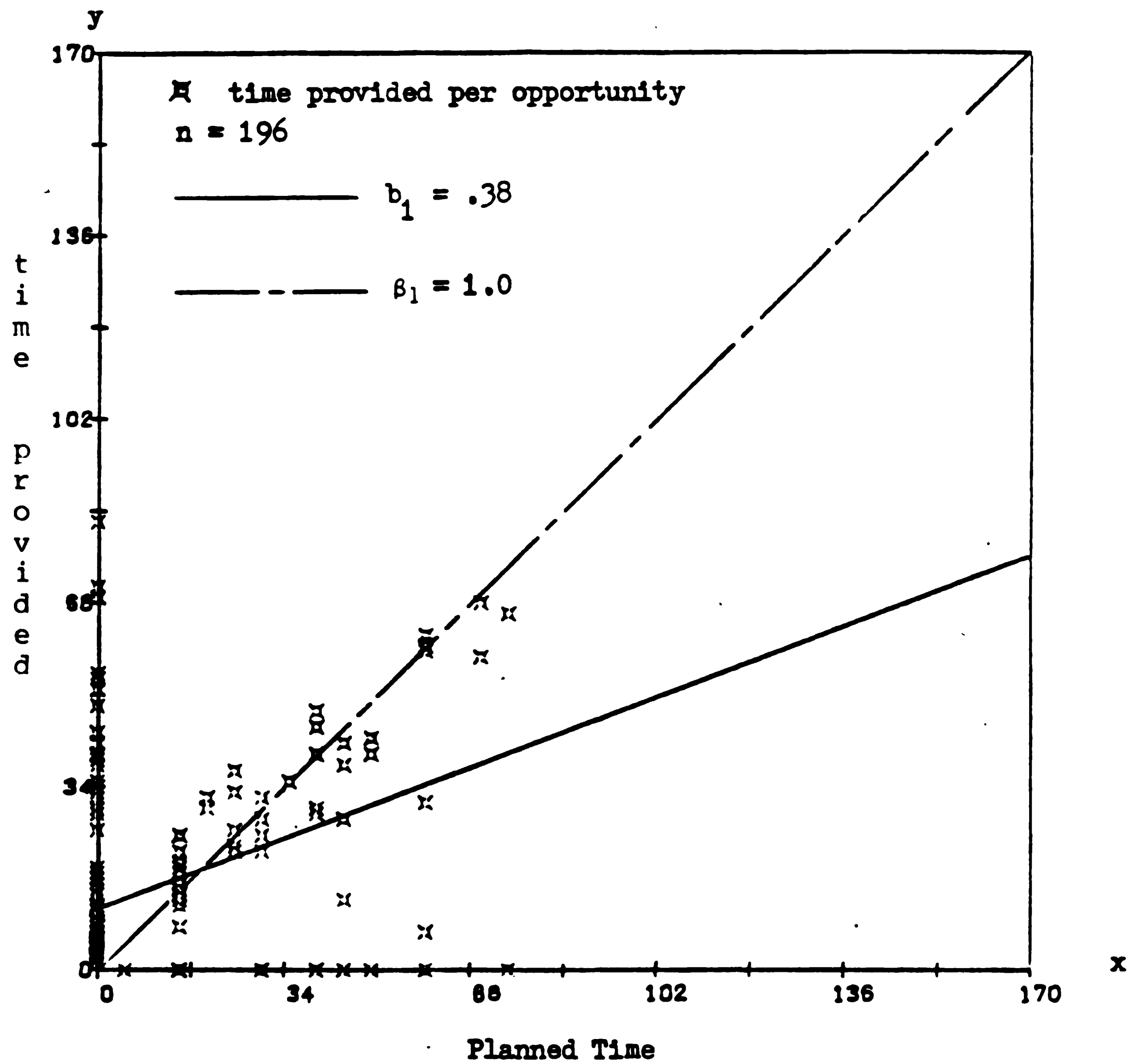

Figure 6.8

Regression Model for Teacher 6's Time Decision Pattern

the time Teacher 6 provided to many other activities did not deviate very much from the logical model.

Such widely different patterns of deviation from the logical model suggest a Model VIII relationship in which actual time allocations appear to differ randomly from the logical model. But Model VIII does not describe the overall relationship between Teacher 6's planned and actual time allocations since many of his/her actual time allocations closely followed the logical model. Because Teacher 6 modified planned time allocations in these different ways, it is difficult to visualize a general time decision pattern from the scatter plot.

Teacher 6's pattern of deviation from the logical model is summarized by the "best fitting" regression line in Figure 6.8. The slope of the regression line indicates that Teacher 6 practiced a linear time decision pattern which conforms to Theoretical Model 6. The slope, however, is quite low (.38). This suggests that there was only a slight similarity between variations in actual time allocations and variations in planned time allocations. The slope difference of .62 suggests that on the average, Teacher 6 shortened planned time allocations by sixty-two percent. In general then, the length of an activity was quite different from its planned length. Thus, we conclude that Teacher 6's planned time allocations did not have a very strong effect on his/her actual time allocations.

Visual analysis of the scatter plot suggests that the regression line is not a very accurate summary of Teacher 6's plan modification pattern; the scatter plot shows that many of his/her actual time allocations deviated substantially from the regression model. In general, it appears that the largest deviations from the regression model occurred with activities which had planned time allocations of zero (unplanned activities) and those which had planned time allocations greater than thirty-four minutes. Large deviations also occurred with a few activities which had planned time allocations less than thirty-four minutes; but, the frequency of large deviations in this time range was not high.

The model indicates that unplanned activities were provided 11.37 minutes. The scatter plot shows that some unplanned activities were provided much less time than this while many others were provided over three times more than this. The average length of unplanned activities indicates, however, that most of them were quite short.

The actual time allocation for most activities with planned time allocations between thirty-four and sixty-eight minutes was either greater or smaller than the time indicated by the predicted model. The model indicates that activities with planned time allocations in this range were provided between twenty-five and thirty-six minutes. But several activities with planned time allocations of about forty minutes were provided about fifteen minutes more time than indicated by the model. And, other activities with planned time allocations of around forty minutes were provided less than half the time indicated by the model.

A similar pattern of deviation from the predicted model occurred with activities which had planned time allocations of around sixty minutes; some of these activities were provided about sixty minutes or twice what the model indicates while several others were provided five or less minutes. The few activities which had planned time allocations greater than sixty-eight also followed this pattern of deviation.

The time allocations for most activities with planned time allocations between zero and thirty-four deviated from the predicted model, but to a smaller degree. The actual time allocations for most activities with planned time allocations between seventeen and thirty-four minutes were greater than the regression model; a few of them were provided about twice the time indicated by the model, but most did not deviate from the predicted model to a very great extent.

Some activities with planned time allocations of around seventeen minutes were provided more time than indicated by the model while what appears to be an equal number of others were provided less time than indicated by the model. The extent of the deviation looks to be nearly the same with both groups of activities. So, the actual time allocation of activities with planned time allocations of around seventeen minutes appears to be on the average, not different from the time indicated by the model.

The scatter plot shows that activities with longer planned time allocations, i.e., greater than thirty-four minutes, and those with zero minutes planned time allocations typically deviated by the greatest amount from the regression model. It appears that as the planned time allocations increase, so does the extent to which actual time allocations deviated from the predicted model.

General Regression Model

Pearson correlation analysis was performed on the combined sample data of the six teachers. We found a moderately high positive correlation of .67 between their planned and actual time allocations. This finding indicates that a positive relationship existed between their planned and actual time allocations. The size of the correlation

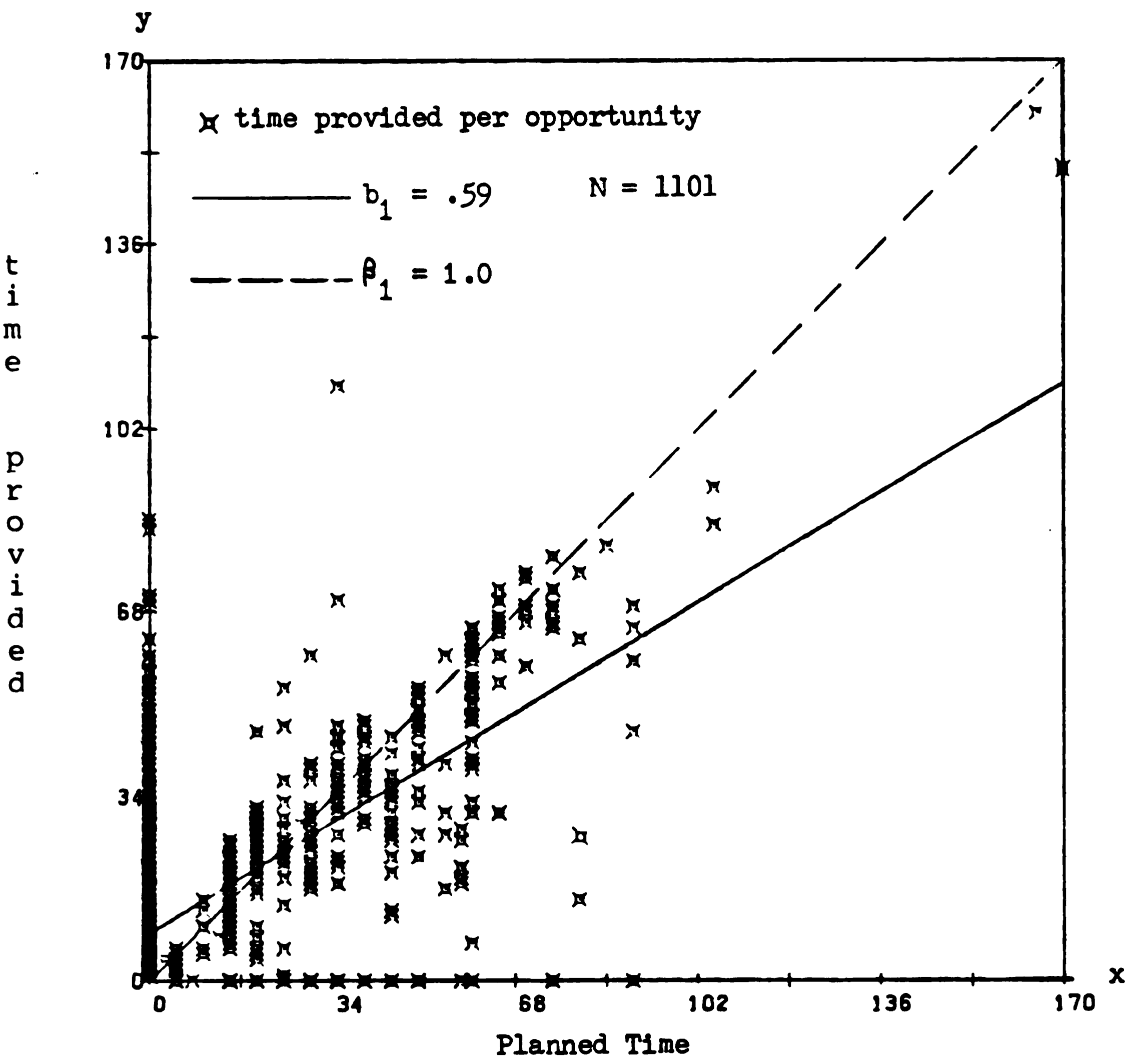

Figure 6.9

Regression Model of the Time Decision Pattern
of All Teachers Combined

suggests that planned time allocations had a moderately strong effect on actual time allocations.

Regression analysis on the combined sample data confirmed that the relationship between teacher planned and actual time allocations was linear. The linear model which best describes this linear association is Theoretical Model 6. Regression coefficients for this general regression model are as follows: $b_0 = 8.7$ and $b_1 = .59$. The ninety-five percent confidence interval for $\hat{\beta}_0$ is 7.68 - 10.76 and for $\hat{\beta}_1$, it is .55 - .63. Because the confidence interval for $\hat{\beta}_0$ does not include zero and the confidence interval for $\hat{\beta}_1$ does not include one, we are ninety-five percent confident that b_0 and b_1 are not equal to zero and one respectively. Thus, we are quite certain that the general model shown in Figure 6.9 accurately describes the association between the teachers' planned and actual time allocations.

A scatter plot of teachers' actual time allocations is shown in Figure 6.9. From it we can see that most of their actual time allocations deviated from the logical model, but not all in the same way. It appears that the way in which actual time allocations deviated from the logical model was related to the length of planned time allocations. Quite a few other activities were provided less time than was planned for them, but the extent of deviation was fairly small. For instance, many short planned time allocations were lengthened while a majority of the long planned time allocations were shortened. On the other hand, middle length planned time allocations (those around twenty-three minutes) do not appear to have been, on the average, changed at all; it looks as though about one-half of them were lengthened and the other one-half were shortened. The way in which teachers modified their planned time allocations occasionally differed from this pattern, but in general, teachers modified planned time allocations in this way. This pattern of plan modification is similar to the pattern suggested for Theoretical Model 6.

The extent of the deviations from the logical model appears to have depended on the length of the planned time allocation. Large deviations occurred most frequently with unplanned activities. Large deviations also occurred frequently with activities whose planned time allocations were between seventeen and fifty-five minutes.

Some activities whose time deviated substantially from the logical model were provided more than twice the time that was planned for them. This pattern of deviation only occurred with unplanned activities and those whose planned time allocations were between seventeen and thirty-four minutes. Frequently, activities with other planned time allocations were provided more time than was planned for them, but the extent of the increase was not large.

Most activities whose time deviated substantially from the logical model were provided much less time than was planned for them. This pattern of deviation occurred with activities within all planned time allocation ranges, but it occurred most often with activities whose planned time allocations were greater than thirty-four minutes. Quite a few other activities were provided less time than was planned for them, but the extent of deviation was fairly small.

The general way in which teachers' actual time allocations deviated from the logical model is summarized by the "best fitting" regression line shown in Figure 6.9. The regression line indicates that the typical time decision pattern for teachers was linear and closely conforms to Theoretical Model 6.

The slope of the regression line is .59. Such a slope suggests that variations in actual time allocations tended to follow variations in planned time allocations.

The slope deviates from the logical model by .41. This slope difference indicates that on the average, teachers shortened the length of planned activities by forty-one percent. Typically then, the length of activities tended to be somewhat similar to their planned length. These findings suggest that teachers' planned time allocations had an effect on their actual time allocations.

The time teachers provided for activities often deviated from the general model; many of the deviations fell within a narrow range, however. Most often deviations from the predicted model for activities with planned time allocations between nine and fifty-three minutes did not exceed seventeen minutes. The smallest range of deviation appears to have occurred with activities whose planned time allocations were between about five and eight minutes. The time provided to activities in this planned time allocation range was typically less than predicted.

About one-half of the activities with planned time allocations between nine and fifty-three minutes were provided more time while the other one-half were provided less time. There were several activities in this time range whose time allocations deviated much more than seventeen minutes, but they were the exception rather than the rule.

Our findings on deviation from the general model suggest that the time indicated by the predicted model is a good indicator of the average time teachers provided for various activities with planned time allocations between nine and fifty-three minutes. Further, the time teachers provided for activities with these planned time allocations typically did not deviate very much from planned time allocations.

The time teachers provided to activities with planned time allocations greater than fifty-three minutes also deviated from the predicted model; most of these activities were provided more time than predicted by the model. In several instances, the time provided to activities in this planned time allocation range deviated from the general model by more than eighteen minutes.

The model indicates that unplanned activities were provided about nine minutes on the average; but the time provided to many unplanned activities deviated greatly from this. It appears that many unplanned activities were provided more than four times the time predicted by the model. But, most unplanned activities were provided nine or less minutes. The wide range of time teachers provided for unplanned activities may have resulted from lack of planning. With no plan to guide them, teachers time decisions may have been influenced more by classroom and student needs than by curricular needs. Since student and classroom time needs would likely vary much more widely than ongoing curricular needs, a wide range of time would be expected for unplanned activities.

Teacher Regression Models Compared to the General Model

Figure 6.10 depicts the regression model for each of the six teachers.[4] From it we can determine how each teacher's model compares to the general model.

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[4]The model for Teacher 2 is nearly identical to the general model. For this reason, consider the model for Teacher 2 to lie over the general model.

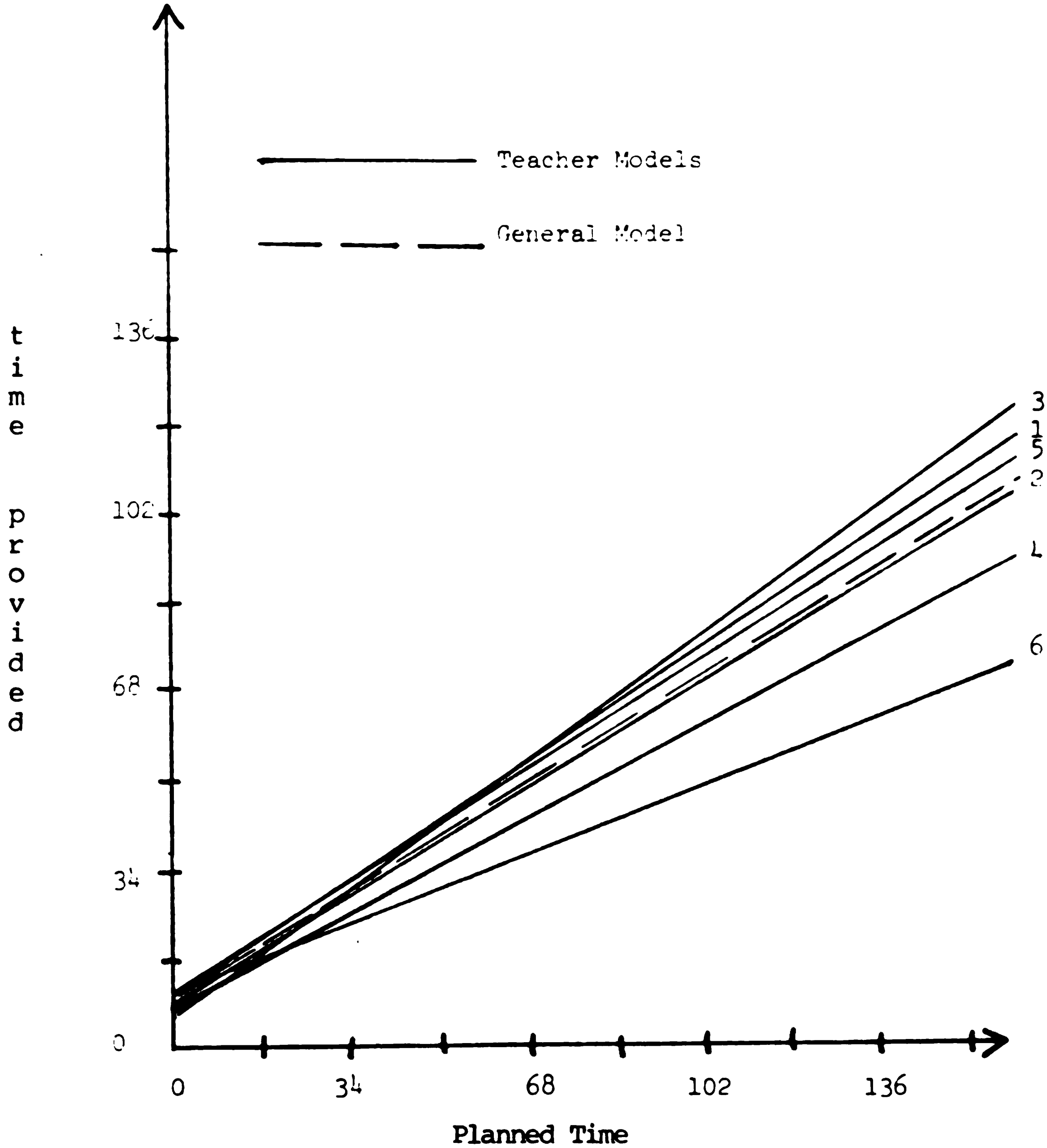

Figure 6.10

Regression Models of the Time Decision Patterns
of the Participating Teachers and the General Model

The intercept of each teacher model is very close to the intercept of the general model. The intercepts for Teachers 1, 5 and 6 were slightly greater than that of the general model while the intercepts for Teachers 2, 3 and 4 were slightly less. The intercepts for Teachers 2 and 4 deviate less than one-half minute from the general model while the intercepts for Teachers 1, 5 and 6 deviated from one and three-fourths to three minutes. The largest deviation occurred with Teacher 4; but, the intercept of his/her model deviated from the general model by just under four minutes.

These findings suggest that the average time teachers provided to unplanned activities was quite similar. Thus, the general model would appear to be a very accurate measure of the time teachers typically provided for unplanned activities. Since the average time teachers provided to unplanned activities was similar, it may be that the kind of unplanned activities they used was also similar. Further, the finding may indicate that teachers had the same purpose for using the unplanned activity, e.g., quiet the class down after recess with a reading assignment, an assignment that could last up to about eight to ten minutes.

Teacher models also do not deviate very much from the general model for activities whose planned time allocations were between zero and thirty-four minutes. The largest deviation from the general model in this planned time allocation range occurred with the models for Teachers 4 and 6; their models diverge from the general model by a wider margin than the other teacher models do. This divergence begins at a planned time allocation of about twenty-five minutes. Even so, the deviation was quite small: the time indicated for activities by the models for Teachers 4 and 6 appears to deviate by no more than five minutes from the time indicated by the general model.

This finding leads us to conclude that the general model is a good measure of the average time teachers provided to activities whose planned time allocations were between zero and thirty-four minutes.

This pattern of minimal deviation from the general model also occurred with Teachers 1-5 for activities whose planned time allocations were between thirty-four and sixty-eight minutes. The model for Teacher 4 deviates from the general model by the greatest amount; but, the times indicated by his/her model for activities in this planned time allocation range are no more than five minutes less than the times indicated by the general model. On the other hand, the times indicated by the models for Teachers 1, 2, 3 and 5 for activities in this time range are only about one to four minutes greater than the times indicated by the general model.

Once again then, we conclude that the general model is an accurate measure of the time Teachers 1-5 typically provided to activities whose planned allocations were between thirty-four and sixty-eight minutes.

The model for Teacher 6 does not follow this same pattern of similarity to the general model; it continues to diverge from the general model for activities whose planned time allocations were greater than thirty-four minutes. The following exemplifies this divergence. For an activity with a planned time allocation of thirty-four minutes, his/her model indicates an average time about five minutes less than the time indicated by the general model. But, for an activity whose planned time allocation was sixty-eight minutes, his/her model indicates an average time over fifteen less than the time indicated by the general model. Such a pattern of deviation from the general model is quite different than the pattern of deviation for other teachers.

For planned time allocations greater than sixty-eight minutes, the models for all teachers except Teacher 5 predict times for activities which differ by ever increasing amounts of time from the times predicted by the general model. But even for very large planned time allocations, i.e., those greater than 136 minutes, the amount of deviation from the general model does not appear to be more than about eighteen minutes for the models of Teachers 1-5. The model for Teacher 6 is an exception to this, however. The time predicted by his/her model for activities with planned time allocations greater than 136 minutes deviates from the time predicted by the general model by more than twenty-five minutes.

It would appear then that the general model is a fair measure of the time Teachers 1-5 provided for activities whose planned time allocations were greater than sixty-eight minutes and a fairly poor measure of the time Teacher 6 provided for activities in this range. However, since teachers rarely planned activities to last longer than sixty-eight minutes (and indeed only a relatively few activities were provided sixty-eight or more minutes), we cannot say whether the general model is a good measure of the time they provided to activities in this planned time allocation range.

In general then, the findings on the deviation of the teacher models from the general model lead us to conclude that the general model is an accurate measure of the time teachers provided to activities whose planned time allocations were between zero and sixty-eight minutes.

Summary

Pearson correlations between each teacher's planned and actual time allocations were positive: the correlations for Teachers 1, 2 and 3 were high, i.e., > .70; the correlation for Teacher 5 was moderate, i.e., $\geq$ .59 < .70; and the correlations for Teachers 4 and 6 were low, i.e., < .59. Even though the correlations differed between teachers, all correlations were positive. The fact that the correlations were positive indicates that a positive relationship existed between each teacher's planned and actual time allocations; in other words, changes in their planned time allocations were associated with like changes in their actual time allocations. Visual analyses of the scatter plots appear to support this conclusion.

Correlational analyses of the data along with visual analyses of the scatter plots led us to another conclusion, namely, that teacher's planned time allocations had an effect on their actual time allocations; the strength of the effect appears to have been greater for teachers whose P/A correlations are high and least for teachers whose P/A correlations are low.

Pearson correlation analysis on the combined data of all six teachers yielded a moderate correlation of .67. This correlation, while falling within the range of a moderate correlation, is quite high. Such a correlation suggests that teachers' planned and actual time allocations were quite strongly related. Visual analysis of the scatter plot of this data leads to the same conclusion. On the basis of these findings then, we conclude that these teachers' planned time allocations had an effect on their actual time allocations.

Regression analyses using a linear regression model confirmed that each teacher's time decision pattern was linear. The regression model of the time decision pattern for each teacher conforms to Theoretical Model 6. All teachers' actual time allocations then, deviated from the logical model in the same way suggesting that teachers were quite similar in the way they modified ther plans. Since none of the confidence intervals for the regression coefficients $\hat{\beta}_0$ include zero, and none of the confidence intervals for $\hat{\beta}_1$ include one, we are ninety-five percent confident that b_0 and b_1 are not equal to zero and one respectively. Thus, we are certain that the regression model for each teacher accurately describes the relationship between his/her planned and actual time allocations.

Regression analysis on the combined sample data produced similar results: the general regression model which best describes the association between teachers' planned and actual time allocations conforms to Theoretical Model 6.

A Model 6 linear relationship indicates that actual time allocations deviated from planned time allocation in three general ways: (1) short planned time allocations were lengthened; (2) middle length planned time allocations remained on the average unchanged; and (3) long planned time allocations were shortened.

The scatter plots show (Figures 6.3 - 6.8) the extent to which teachers' modification of their planned time allocations followed this pattern. These scatter plots reveal that teachers typically did not follow the theoretical pattern of plan modification in the way they modified short planned time allocations. It was expected that teachers would typically increase the length of most short planned time allocations. This type of plan modification did occur, but not nearly to the extent anticipated; instead, teachers decreased the length of many short planned time allocations. All teachers did, however, provide time to many unplanned activities. In other words, teachers lengthened only one short planned time allocation, the shortest one of all rather than lengthen activities in the whole range of short planned time allocations.

For the most part, Teachers 2-6 modified middle length planned time allocations according to the theoretical pattern for Model 6. The effect of this practice was that on the average, middle length planned time allocations remained unchanged. Teacher 1, on the other hand, modified middle length planned time allocations differently from the Model 6 pattern. His/her practice was to shorten all of them.

Teacher plan modification practices were a bit more unsystematic when it came to long planned time allocations. Teachers 1-3 typically shortened long planned time allocations while Teachers 4-6 appear to have lengthened about as many as they shortened. It appears that Teachers 4-6 shortened long planned time allocations to a much greater degree than they lengthened others.

The scatter plot of the combined data (Figure 5.13) clearly shows that teachers modified their planned time allocations quite similarly to the plan modification pattern for Theoretical Model 6.

The "best fitting" regression lines in Figures 6.3-6.8 summarize the time decision pattern for each teacher. The slope of each regression line is positive indiciating each teacher's time decision pattern was linear.

The size of the slopes varied from .38 for Teacher 6 to .72 for Teacher 3, while the slope of the general model was found to be .59.

The larger the slope, the more closely variations in actual time allocations followed variations in planned time allocations.

The deviation of the slope from the logical model indicates the extent to which a teacher typically modified his/her planned time allocations. The findings from these analyses show that Teacher 3 shortened his/her planned time allocations the least (just over one-third) while Teacher 6 shortened his/her planned time allocations the most (nearly two-thirds). The deviation of the slope of the general model from the slope of the logical model shows that on the average, teachers shortened their planned time allocations by about forty percent. On the average then, teachers' planned and actual time allocations were somewhat similar. Thus, it appears that teachers' planned time allocations had an effect on their actual time allocations.

From the scatter plots (Figures 6.3-6.8), we can see that in some cases, a teacher's actual time allocations deviated considerably from the times predicted by his/her model. Large deviations from the predicted model typically occurred at different planned time allocation ranges for different teachers. There was some similarity across teachers in the planned time allocation ranges at which large deviations occurred; but, there was only one planned time allocation range for which all teachers' actual time allocations commonly deviated by a large margin from the regression model. This planned time allocation was zero. The models predicted that unplanned activities (activities with planned time allocations of zero) were provided on the average from about five to just over eleven minutes; it was not uncommon, however for teachers to provide twenty to forty minutes more than this to unplanned activities. In some cases, the time they provided for unplanned activities differed from the average time for them by more than forty minutes.

Other planned time allocations for which teacher's actual time allocations deviated substantially from the regression models were two to fifteen minutes, fifteen to thirty-five minutes, thirty-five to forty-five minutes and forty-five to sixty minutes. Actual time allocations for activities with planned time allocations of fifteen to thirty-five and thirty-five to forty appear to have been especially susceptible to large deviations from the model; in these time ranges, five of the six teachers provided time to activities which greatly deviated from the times indicated by their models. The pattern of deviation was not the same for all five teachers, however. In the fifteen to thirty-five minute range, the actual time allocations of Teachers 1, 3 and 5 were much less than their model indicates; the allocations of Teacher 4 were either much greater or lesser than his/her model; and the allocations of Teacher 6 were generally much greater than his/her model indicates.

In the thirty-five to forty-five minute planned time allocation range, there was a bit more similarity across the five teachers in the way each one's actual time allocations deviated from his/her regression model. Teacher 2, 3 and 5 provided much less time while Teachers 4 and 6 provided either much more or much less time for planned activities than indicated by their models.

Some of the actual time allocations by four of the six teachers for activities in the forty-five to sixty minute planned time allocation range also deviated substantially from their regression model. Teachers 1 and 2 provided much less time, while Teachers 4 and 6 provided either more or less time than predicted by their models.

The actual time allocations of just three of the six teachers for activities in the two to twenty-five minute range deviated substantially from their models. Of the four ranges previously identified as having the greatest frequency of large deviations, this one appears to have the smallest number of large deviations.

From the scatter plot in Figure 6.9, it appears that most of the teachers' actual time allocations to activities deviated from the general model by not more than seventeen minutes. Thus, it seems that the general model quite accurately portrays the relationship between teachers' planned and actual time allocations.

Overall, the general model appears to be an accurate measure of the time teachers provided to activities whose planned time allocations were between zero and sixty-eight minutes. Teacher models are somewhat different from the general model, however, for planned time allocations larger than sixty-eight minutes. Thus, the general model does not appear to give a true picture of actual time allocations for activities whose planned time allocations are greater than sixty-eight minutes.

Regression Models for Content Areas Compared To Theoretical Models

Pearson correlation analyses were performed on the sample data to determine the direction and extent of the relationship between planned and actual time allocations by teachers in this study for Language Arts, Reading and Math.

Sample data were then submitted to linear regression analyses in order to obtain a descriptive model of each teacher's time decision pattern for each of the three content areas. These regression models were then analyzed to see how they compared to the theoretical models that we hypothesized could describe a teacher's time decision pattern, whether for a part of a day, e.g., one content area, or a full day.

<u>Language Arts</u>

Results of the Pearson correlation analyses for Language Arts are shown in Table 6.3. A positve correlation was found between planned and actual time allocations of Teachers 1-3, 5 and 6. These findings indicate that the time teachers provided to Language Arts activities was related in a positive fashion with their planned time allocations. A negative correlation was found between Language Arts planned and actual time allocations of Teacher 4. This finding indicates that his/her actual time allocations to Language Arts activities had a negative relationship with his/her planned time allocations; in other words, long planned time allocations tended to be much shorter than planned and short planned time allocations tended to be much longer than planned.

Teachers differed in the extent to which their Language Arts planned and actual time allocations correlated. Teacher 1 was the only teacher whose P/A correlation was high (.89) and only one teacher, Teacher 3, had a moderate P/A correlation (.61). The P/A correlations for the other four teachers were low: for Teacher 2 it was .43; for Teacher 4, -.26; for Teacher 5, .27; and for Teacher 6, .46. So even though five of the six correlations were positive, four of them were low. These findings indicate then, that the relationship between the planned and actual time allocations for most teachers was not very strong.

Regression analyses of the Language Arts data provided models

Table 6.3

Pearson Correlations Between Planned time Allocations and Actual Time Allocations for Language Arts by Teacher

Teacher	r	n
1	.89	25
2	.43	19
3	.61	25
4	-.26	11
5	.27	12
6	.46	19

which described each teacher's time decision pattern for Language Arts. We found that the time decision pattern for Teachers 1-3, 5 and 6 could best be described by a linear model resembling Theoretical Model 6. The time decision pattern for Teacher 4 could best be described by a linear model which resembles Theoretical Model IX. Regression coefficients for this model are $\beta_0 > 0$ and $\beta_1 < 0$.

Regression coefficients for the regression models are shown in Table 6.4. As can be seen from the Table, regression values for Teachers 1-3, 5 and 6 conform to the regression values of Model 6, while regression values for Teacher 4 conform to the regression values of Model IX. We cannot be certain, however, that the b_0 regression values for Teachers 3 and 5 are different from zero since the ninety-five percent confidence interval for $\hat{\beta}_0$ includes zero. Thus, we cannot be certain that the regression model for each teacher accurately describes their true time decision pattern in Language Arts.

For Teachers 1, 2, 4 and 6, the $\hat{\beta}_0$ confidence interval does

Table 6.4

Regression Coefficients and 95% Confidence Interval for Language Arts by Teacher

Teacher	n	b_0	b_1	95% Confidence Interval $\hat{\beta}_0$	95% Confidence Interval $\hat{\beta}_1$
1	25	13.12	.67	5.8 - 20.4	.53 - .82
2	19	11.42	.24	3.6 - 19.2	⁻.01 - .49
3	25	5.32*	.47	⁻.97- 1.6	.21 - .73
4	11	43.62	⁻.37	16.5 - 70.7	⁻1.41 - .67
5	12	16.28*	.21	⁻9.4 - 42.0	⁻.31 - .73
6	19	23.34	.43	14.0 - 32.7	.008- .85

*Confidence interval crosses zero so regression coefficient b_0 may not be different from zero.

does not include zero and the $\hat{\beta}_1$ confidence interval does not include one. Therefore, we are ninety-five percent confident that b_0 and b_1 for these teachers are not equal to zero and one respectively. We are quite confident then that the regression models for Teachers 1, 2, 4 and 6 accurately describe their Language Arts time decision patterns.

We theorized that in a Model 6 relationship, a teacher would modify his/her planned time allocations so that short ones would be longer than planned; middle length ones would on the average be the same length; and long ones would be shorter than planned. The scatter plot in Figure 6.11 shows that Teacher 1 lengthened most short planned time allocations, provided about as much time as planned to the middle length planned time allocations and shortened all long ones. So in general, Teacher 1 modified his/her planned time allocations according to the theoretical pattern.

In some instances, however, the amount of time Teacher 1 provided for planned activities was considerably less than what (s)he had planned. Furthermore, (s)he provided time for nearly as many unplanned activities as (s)he did for planned activities. Thus, it appears that Teacher 1's actual time allocations to Language Arts often were not greatly influenced by his/her Language Arts planned time allocations. In a few instances, the amount of time Teacher 1 provided for planned activities quite closely approximated his/her planned time allocations to them. For these activities then, Teacher 1's actual time allocations apparently were quite strongly related to his/her planned time allocations to Language Arts. Overall, Teacher 1's actual time allocations to Language Arts appear to have been moderately related to

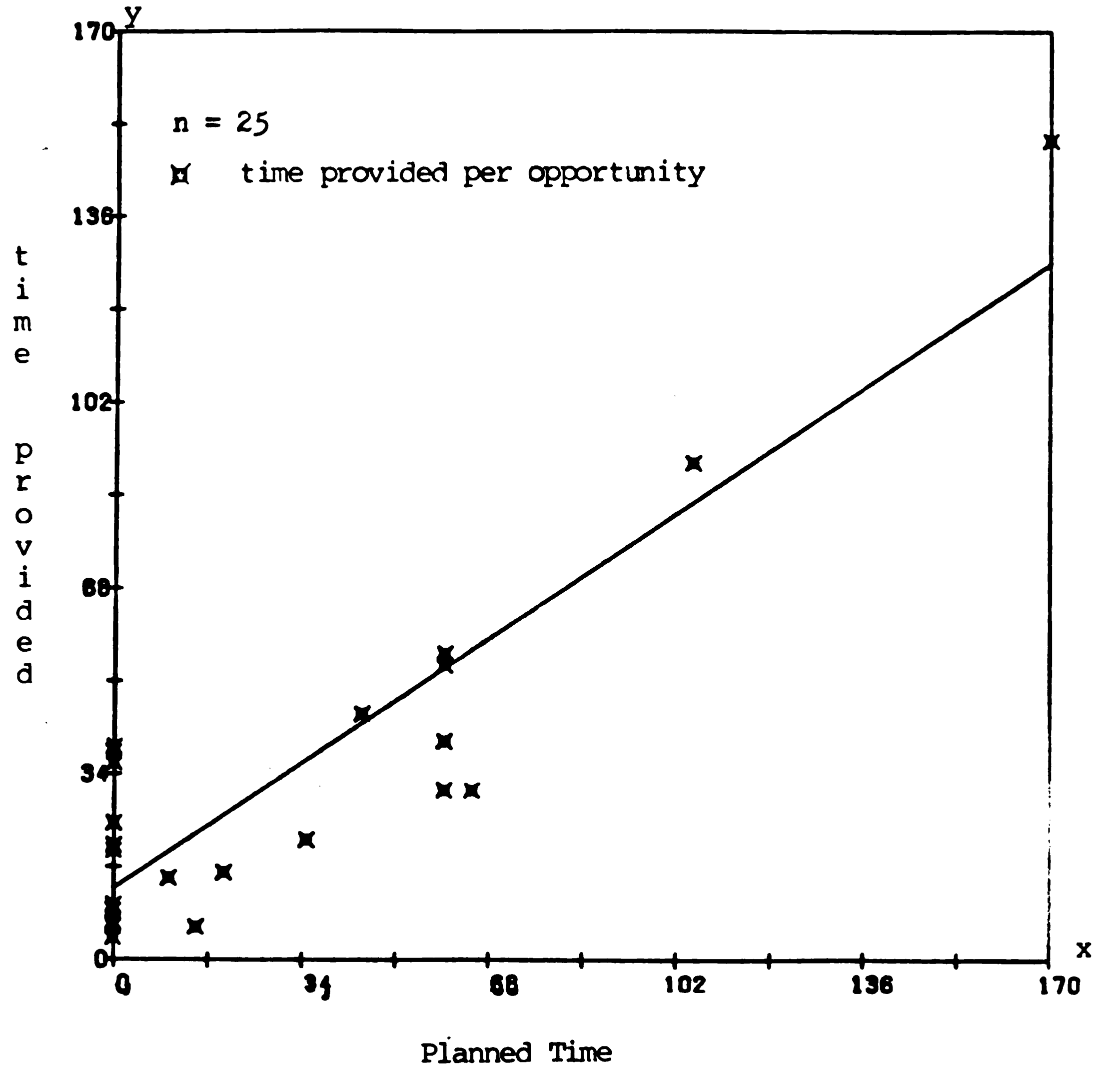

Figure 6.11

Regression Model for Teacher 1's Language Arts
Time Decision Pattern

his/her planned time allocations to Language Arts.

The "best fitting" regression line for Teacher 1 shown in Figure 6.11 summarizes his/her time decision pattern. The slope is moderately high (.67) suggesting that overall, Teacher 1's actual time allocations to Language Arts were similar in length to his/her planned time allocations to Language Arts. This conclusion is supported by the high Pearson correlation (.89) which indicates that Teacher 1's planned and actual time allocations were quite strongly related.

A slope less than one indicates, however, that overall Teacher 1's actual time allocations to Language Arts were less than his/her planned time allocations to Language Arts. The slope difference (.33) suggests that (s)he typically shortened Language Arts planned time allocations by thirty-three percent.

The scatter plot in Figure 6.12 reveals that in almost every case, Teacher 3 provided less time to planned Language Arts activities than (s)he had planned. For some of them there was a large difference in time between the actual and the planned, e.g., (s)he did not provide any time to at least three planned Language Arts activities. So, even though Teacher 3 provided time for many planned activities, often the time (s)he provided for them differed substantially from the planned. This pattern suggests then that Teacher 3's actual time allocations were only moderately related to his/her planned time allocations.

The regression line describing this time decision pattern is shown in Figure 6.12. The ninety-five percent confidence interval for $\hat{\beta}_0$ includes zero; thus, we cannot be certain that the intercept, b_0, for Teacher 3 is different from zero. The ninety-five percent confidence

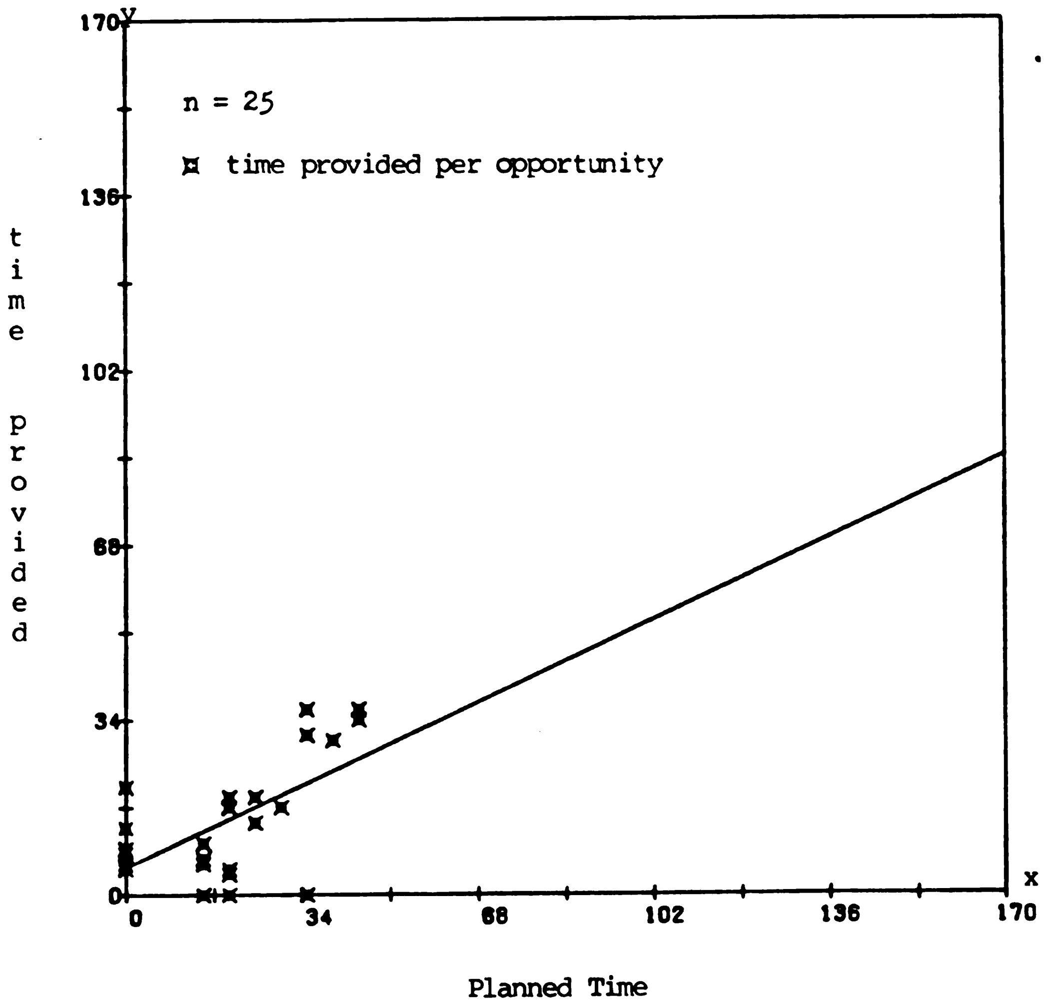

Figure 6.12

Regression Model for Teacher 3's Language Arts
Time Decision Pattern

interval for $\hat{\beta}_1$ does not include one; therefore, we are ninety-five percent certain that b_1 is not equal to one. Thus, we are quite certain that the slope of this regression model accurately represents the relationship between Teacher 3's planned and actual time allocations. Since b_0 may be zero, we cannot be certain that the regression model accurately represents Teacher 3's time decision pattern for Language Arts.

The low slope of the regression line (.47) suggests that overall, Teacher 3's actual time allocations to Language Arts differed considerably from his/her planned time allocations to it. The slope difference indicates that actual time allocations differed by about fifty-three percent from his/her planned time allocations. On the basis then of these findings, it appears that Teacher 3's planned time allocations had an effect on his/her actual time allocations, but the effect was not large.

In Figure 6.13, the regression line describing the time decision pattern for Teacher 6 is shown. The positive slope (.43) suggests that his/her actual time allocations to Language Arts activities tended to be of the same magnitude as planned time allocations, i.e., if a planned time allocation was long, the actual time allocation tended to be long; but the small size of the slope indicates that typically, there was a fairly large difference between Teacher 6's planned and actual time allocations. The slope difference (.57) suggests that his/her planned time allocations were shortened on the average by about fifty-seven percent. Such a large slope difference suggests major modifications of his/her planned time allocations.

When we examine the scatter plot in Figure 6.13, it appears that

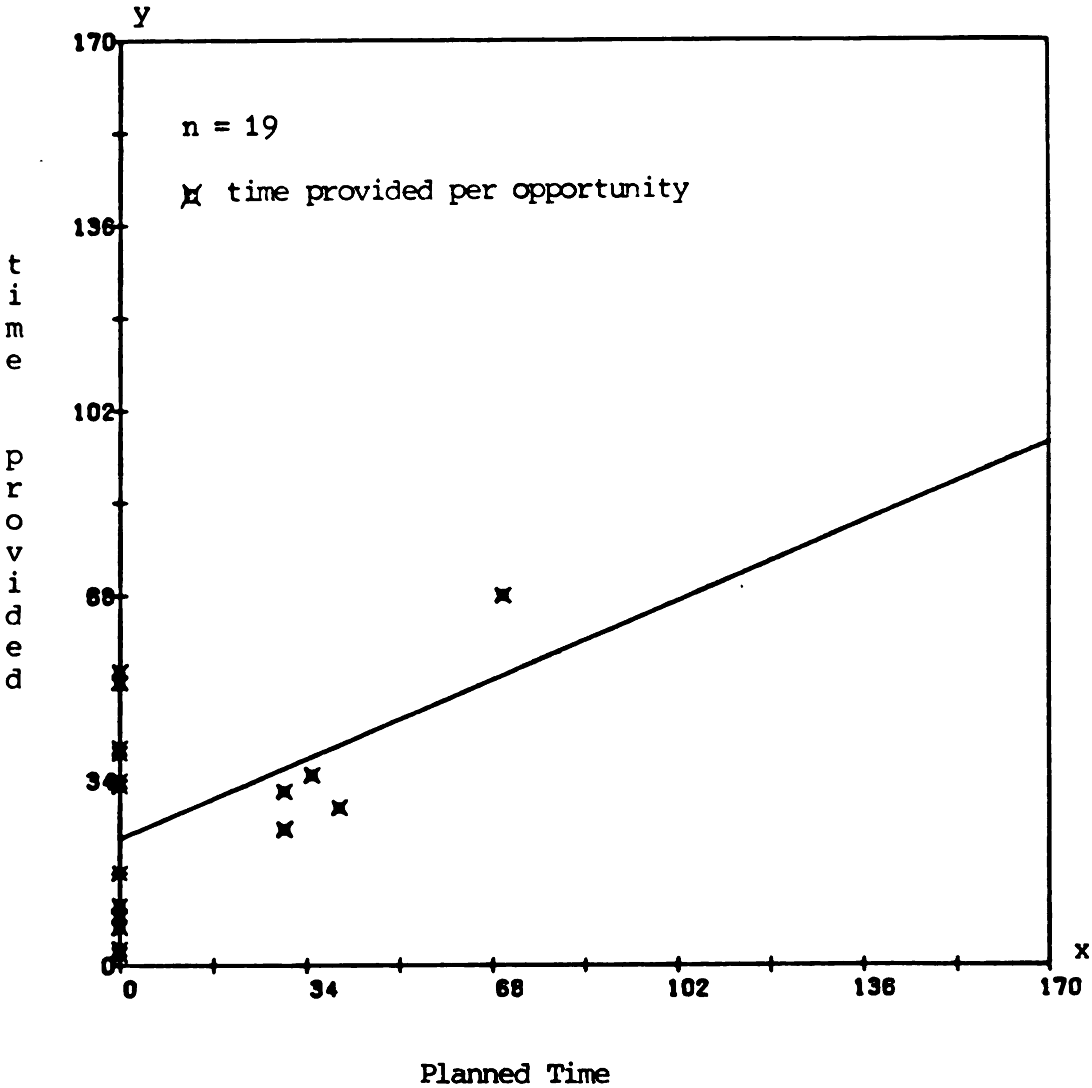

Figure 6.13

Regression Model for Teacher 6's Language Arts
Time Decision Pattern

the slope does not accurately represent the association between the time Teacher 6 provided for planned activities and the time (s)he had planned for them; in all cases, the time Teacher 6 provided for planned activities was very close to what (s)he had planned for them. In other words, if Teacher 6 planned a Language Arts activity, (s)he provided nearly the same amount of time (s)he had planned for it. Evidently then, the value of the slope is low for some other reason. Teacher 6 consistently provided time for many unplanned activities. The time provided for unplanned Language Arts activities is not related at all to his/her planned time allocations for Language Arts. Thus, even though the time Teacher 6 provided for the few planned activities was almost identical to the time (s)he had planned for them, his/her predominate practice was to provide time to many unplanned activities. The low slope reflects this practice, as does the Pearson correlation (.46).

It appears from the scatter plots in Figures 6.14-6.16 that actual time allocations by Teachers 2, 4 and 5 had a weak relationship to their planned time allocations. In several instances, the actual time allocations by these teachers were the same as what they had planned, but most often their actual time allocations were substantially different from their planned time allocations.

In addition, Teachers 2 and 5 provided time for nearly as many unplanned activities as they did for planned ones. Teacher 4 provided time to only one or two unplanned activities but it appears that the time (s)he provided for planned activities differed randomly from his/her planned time allocations for them. The time Teachers 2 and 5 provided for planned activities also appears to have differed randomly

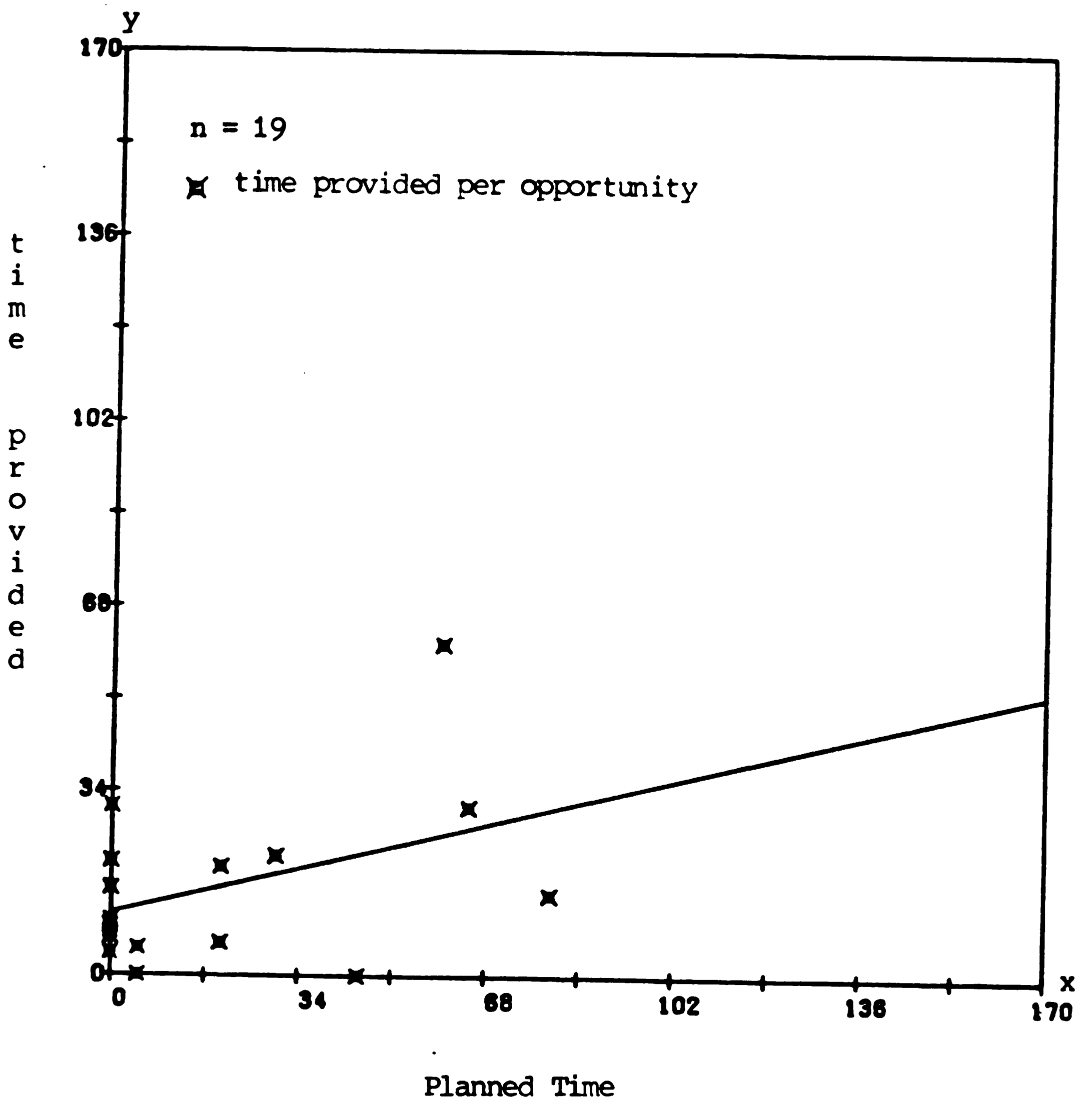

Figure 6.14

Regression Model for Teacher 2's Language Arts
Time Decision Pattern

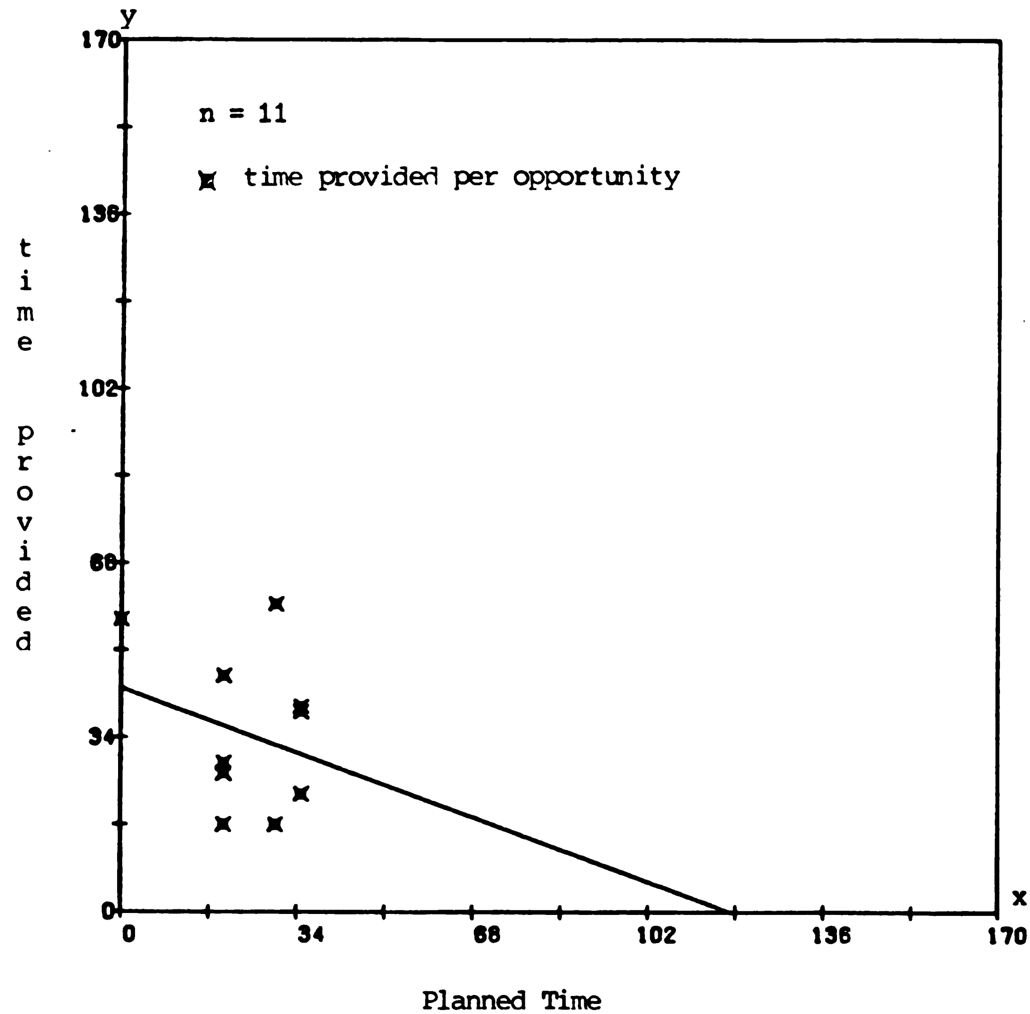

Figure 6.15

Regression Model for Teacher 4's Language Arts
Time Decision Pattern

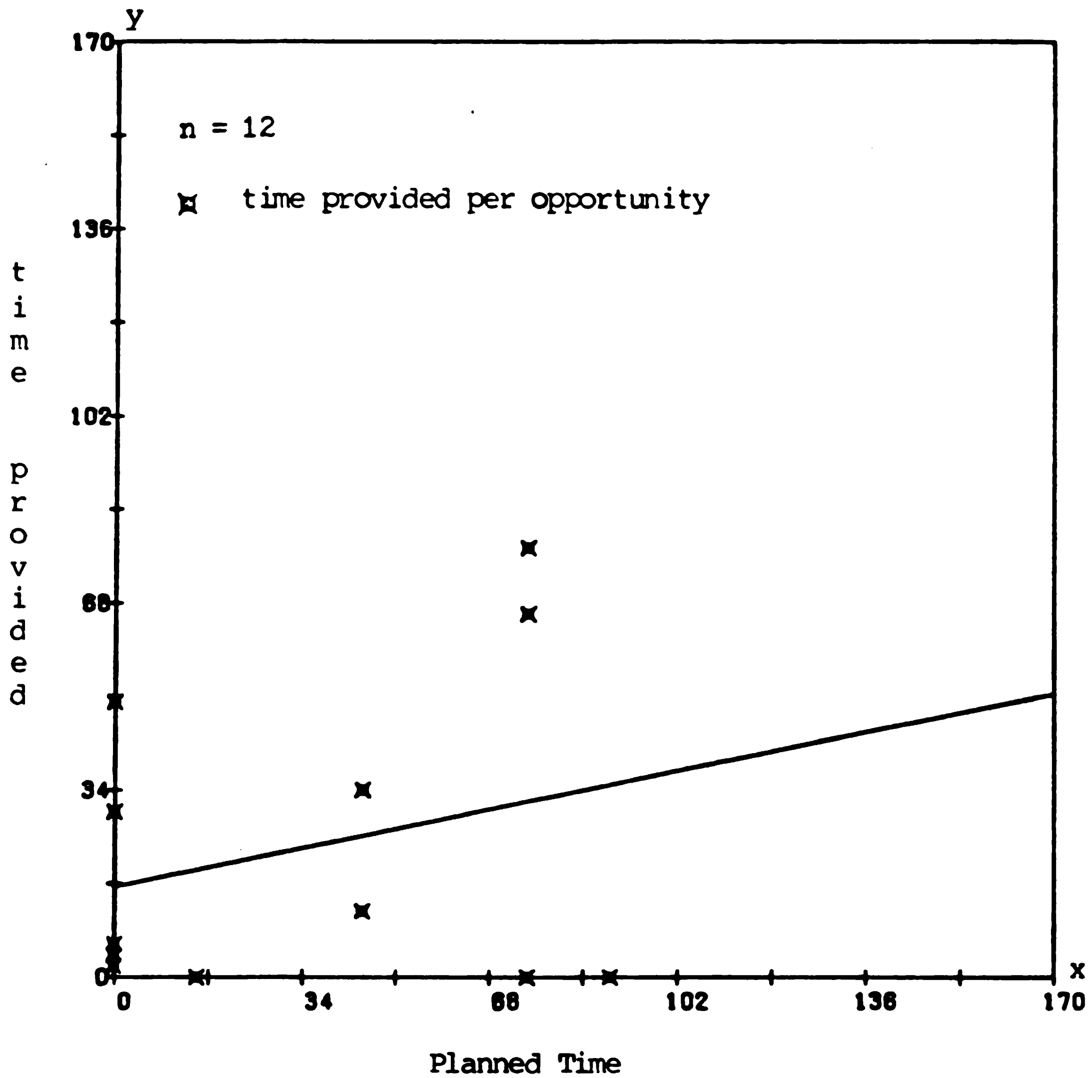

Figure 6.16

Regression Model for Teacher 5's Language Arts
Time Decision Pattern

from their planned time allocations for them.

We conclude then from the scatter plots that these teachers' Language Arts planned time allocations had little or no effect on the time they provided for Language Arts.

"Best fitting" regression lines describing the time decision pattern in Language Arts for Teachers 2, 4, and 5 are shown in Figures 6.14, 6.15 and 6.16 respectively. The slope of each of these regression lines is very low (.24 for Teacher 2; -.37 for Teacher 4; and .21 for Teacher 5). These low slopes suggest that the time decision patterns for these teachers was weakly linear; in other words, variations in their actual time allocations were only weakly associated with variations in their planned time allocations. The "best fitting" regression lines suggest the time decision patterns for Teachers 2 and 5 were similar to Theoretical Model 6 while the time decision pattern for Teacher 4 was similar to Theoretical Model IX.

The slope differences for Teachers 2 (.76) and 5 (.79) show that they shortened planned time allocations on the average over seventy-five percent. The slope difference for Teacher 4 (-.63) showw that (s)he increased planned time allocations on the average by sixty-three percent. Such major modifications of the plan suggest that the planned time allocations for Teachers 2, 4 and 5 had little or no effect on the time they provided for Language Arts.

Reading

The results of the Pearson correlation analyses for Reading are shown in Table 6.5. A positive correlation was found for Teachers 3, 4 and 5. These findings suggest that there was a positive relationship between their Reading planned time allocations and the time they provided for Reading in their classrooms.

Table 6.5

Pearson Correlations Between Planned and Actual Time Allocations of Teachers for Reading

Teacher	r	n
1	-.17	10
2	-.15	11
3	.86	25
4	.40	16
5	.83	22
6	-.08	16

The P/A correlations for Teachers 3 and 5 were high. This suggests that the relationship was very strong. The low P/A correlation for Teacher 4 suggests that the relationship between his/her planned and actual time allocations for Reading was not very strong.

A negative correlation was found for Teachers 1, 2 and 6. These findings suggest that there was a negative relationship between their planned and actual time allocations for Reading. All negative P/A correlations were extremely low, however. This fact leads us to question whether or not a relationship existed between their planned and actual time allocations for Reading.

Regression analyses of the Reading data provided models which described each teacher's time decision pattern for Reading. We found that the pattern for Teachers 3, 4 and 5 could best be described by a regression model similar to Theoretical Model 6. The patterns for Teachers 1, 2 and 6 could best be described by a regression model similar to Theoretical Model IX.

Regression coefficients for the regression model which describes the association between each teacher's planned and actual time allocation for Reading are shown in Table 6.6. Since none of the $\hat{\beta}_0$ confidence intervals for Teachers 1, 2, 4 and 5 include zero, we are ninety-five percent confident that b_0 for these teachers is not equal to zero. The ninety-five percent confidence interval for $\hat{\beta}_0$ for Teachers 3 and 6 does include zero. Therefore, we cannot be certain that the intercepts (b_0) for these teachers are different from zero.

The confidence interval for $\hat{\beta}_1$ for Teachers 1-4, 6 does not include one. We are ninety-five percent confident then that b_1 for these teachers does not include one. The confidence interval for $\hat{\beta}_1$ for Teacher 5 does not include one. We cannot be certain then that the slope of (b_1) for Teacher 1 is different from one.

Based on the confidence intervals, we are quite certain that the regression models for Teachers 1, 2 and 4 accurately describe their time decision patterns. Since the $\hat{\beta}_0$ confidence interval for Teachers 3 and 6 includes zero and the $\hat{\beta}_1$ confidence interval for Teacher 5 includes one, we cannot say with any degree of certainty whether the regression models for Teachers 3, 5 and 6 accurately describe their time decision patterns.

The scatter plot in Figure 6.17 suggests that the time decision pattern of Teacher 3 for Reading was linear. But, not all of his/her actual time allocations fit this pattern. It appears that Reading activities that had been allocated just less than seventeen minutes were provided on the average about seventeen minutes. Several other planned Reading activities with allocations between seventeen and

Table 6.6

Regression Coefficients and 95% Confidence Interval for Reading by Teacher

Teacher	n	b_0	b_1	95% Confidence Interval $\hat{\beta}_0$	$\hat{\beta}_1$
1	10	25.24	¯.06	14.9 - 35.6	¯.33 - .22
2	11	21.34	0.06	9.7 - 33.0	¯.38 - .25
3	25	2.92*	.73	¯3.1 - 8.9	.55 - .92
4	16	15.45	.19	7.4 - 23.5	¯.06 - .43
5	22	12.88	.76	2.8 - 23.5	.52 -1.0
6	16	5.08*	¯.03	¯1.2 - 11.3	¯.28 - .21

*May be zero

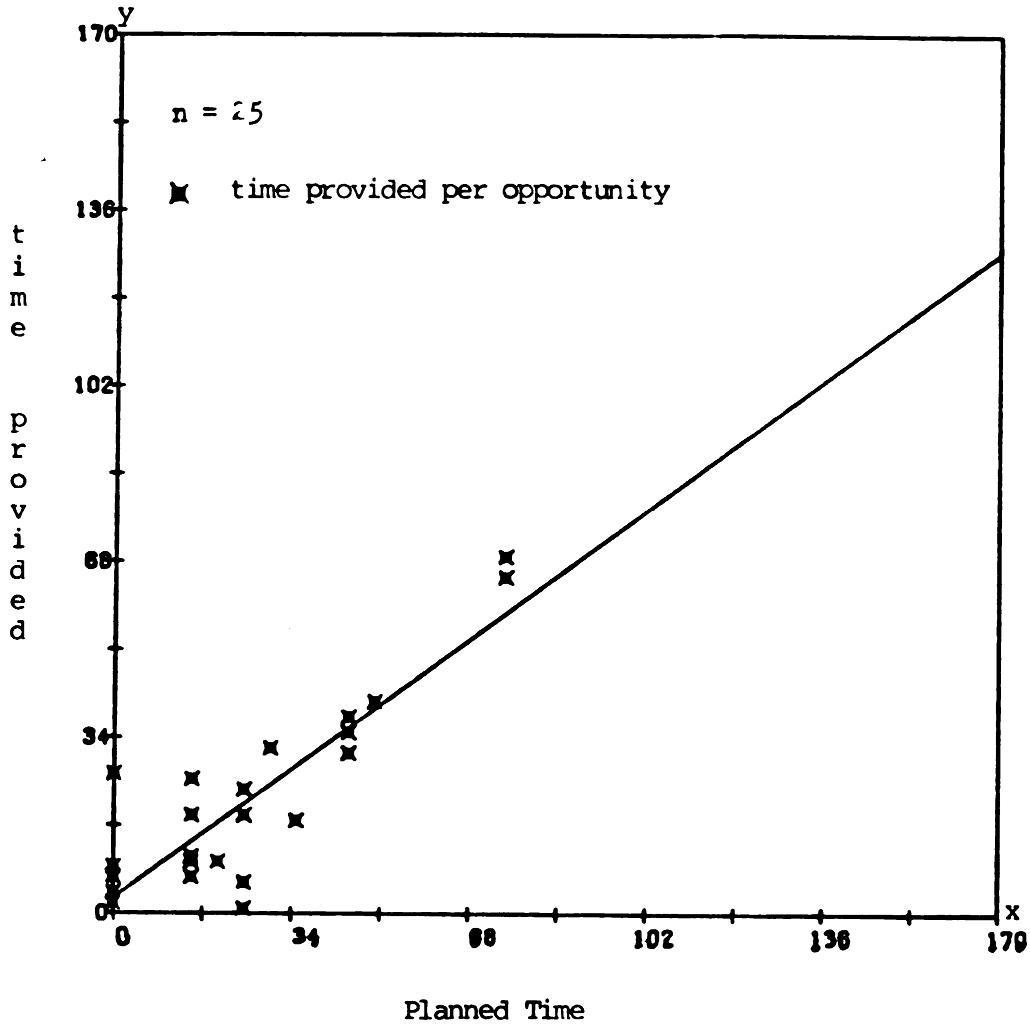

Figure 6.17

Regression Model for Teacher 3's Reading
Time Decision Pattern

thirty-four minutes were also provided nearly the same amount of time that was allocated to them; some were provided slightly more time while others were provided slightly less time. All the rest of Teacher 3's actual time allocations to planned Reading activities were less than their planned time allocation.

Some of Teacher 3's allocations to Reading activities deviated substantially from what (s)he had intended for them. Teacher 3 also provided time for several unplanned Reading activities; but it appears that the time (s)he provided to most unplanned activities was quite small.

The "best fitting" regression line which summarizes the Reading time decision pattern for Teacher 3 is shown in Figure 6.17. It conforms to Theoretical Model 6. The large slope for this pattern (.73) indicates that on the average, the time Teacher 3 provided for planned Reading activities was quite similar to the time (s)he had allocated to them in his/her plan; in other words, the time (s)he provided for planned Reading activities did not differ very much from what (s)he had planned. A high degree of similarity is also indicated by the slope difference which showed that actual time allocations were only about twenty-seven percent shorter on the average than his/her planned time allocations. It would seem then that Teacher 3's planned time allocations in Reading had a fairly strong effect on his/her actual time allocations to Reading.

The scatter plot for Teacher 5 is shown in Figure 6.18. It suggests that his/her time decision pattern in Reading was also linear. We can see that in most cases Teacher 5 provided nearly the same amount of time to planned Reading activities as (s)he had planned; in

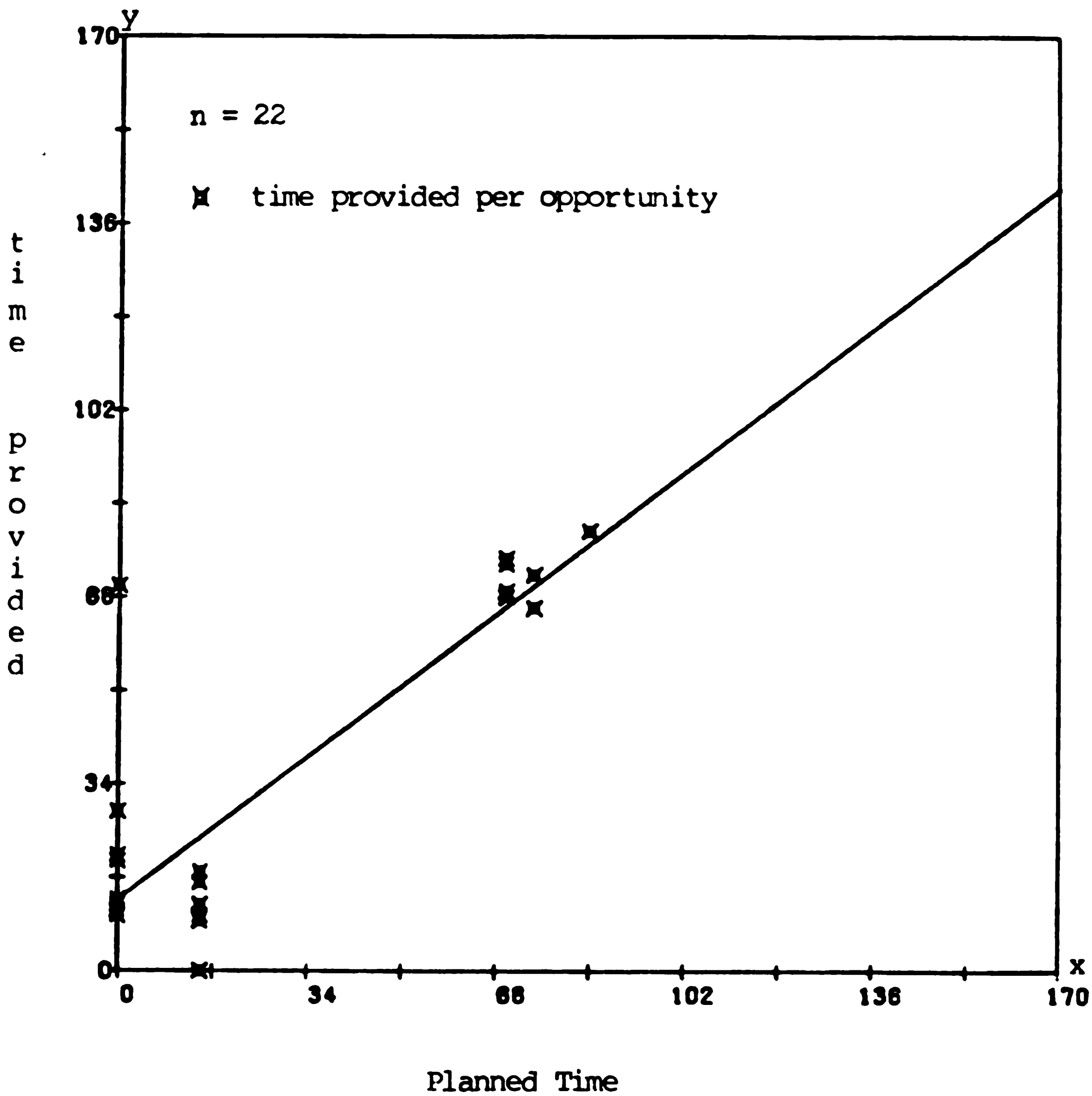

Figure 6.18

Regression Model for Teacher 5's Reading
Time Decision Pattern

only a few instances (planned time allocations of about seventeen minutes) did Teacher 5 provide a substantially different amount of time to planned activities than (s)he had planned. Another instance was his/her actual time allocations to unplanned Reading activities.

The "best fitting" regression line which summarizes the Reading time decision pattern for Teacher 5 is shown in Figure 6.18. It conforms to Theoretical Model 6. The slope of the regression model is very high (.76) despite the fact that Teacher 5 provided time for unplanned activities. Such a large slope indicates that on the average, the time Teacher 5 provided for Reading activities was very nearly the same as (s)he had allocated to Reading in his/her plan.

A slope of less than one, however, suggests that on the average, Teacher 5's actual time allocations to Reading were shorter than what (s)he had planned. The slope difference suggests that his/her actual time allocations to Reading were on the average about twenty-four percent less than his/her planned time allocations to Reading.

Overall, the regression model of Teacher 5's time decision pattern suggests that his/her planned Reading time allocations had a strong effect on his/her actual time allocations to Reading.

The scatter plots for Teachers 1, 2, 4 and 6 are shown in Figures 6.19-6.22. The regression models for Teachers 1, 2 and 6 resemble Theoretical Model IX and the regression model for Teacher 4 resembles Theoretical Model 6. The slope of each regression line is very low. This suggests that the time these teachers provided for Reading was very weakly related to their planned time allocations for Reading.

The slope difference for these four teachers is very large (.81 for Teacher 4, .94 for Teachers 1 and 2 and .97 for Teacher 6). Such

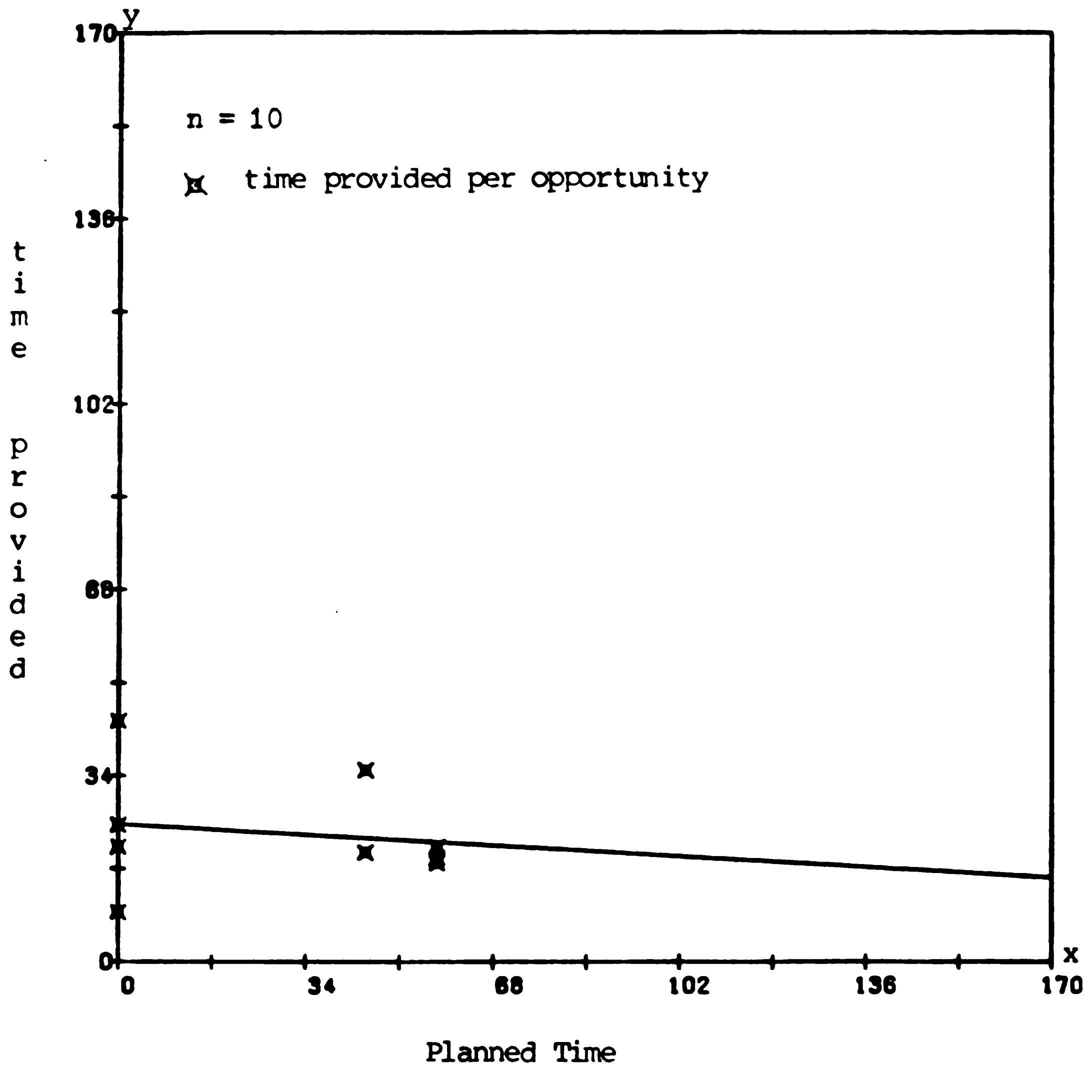

Figure 6.19

Regression Model for Teacher 1's Reading Time Decision Pattern

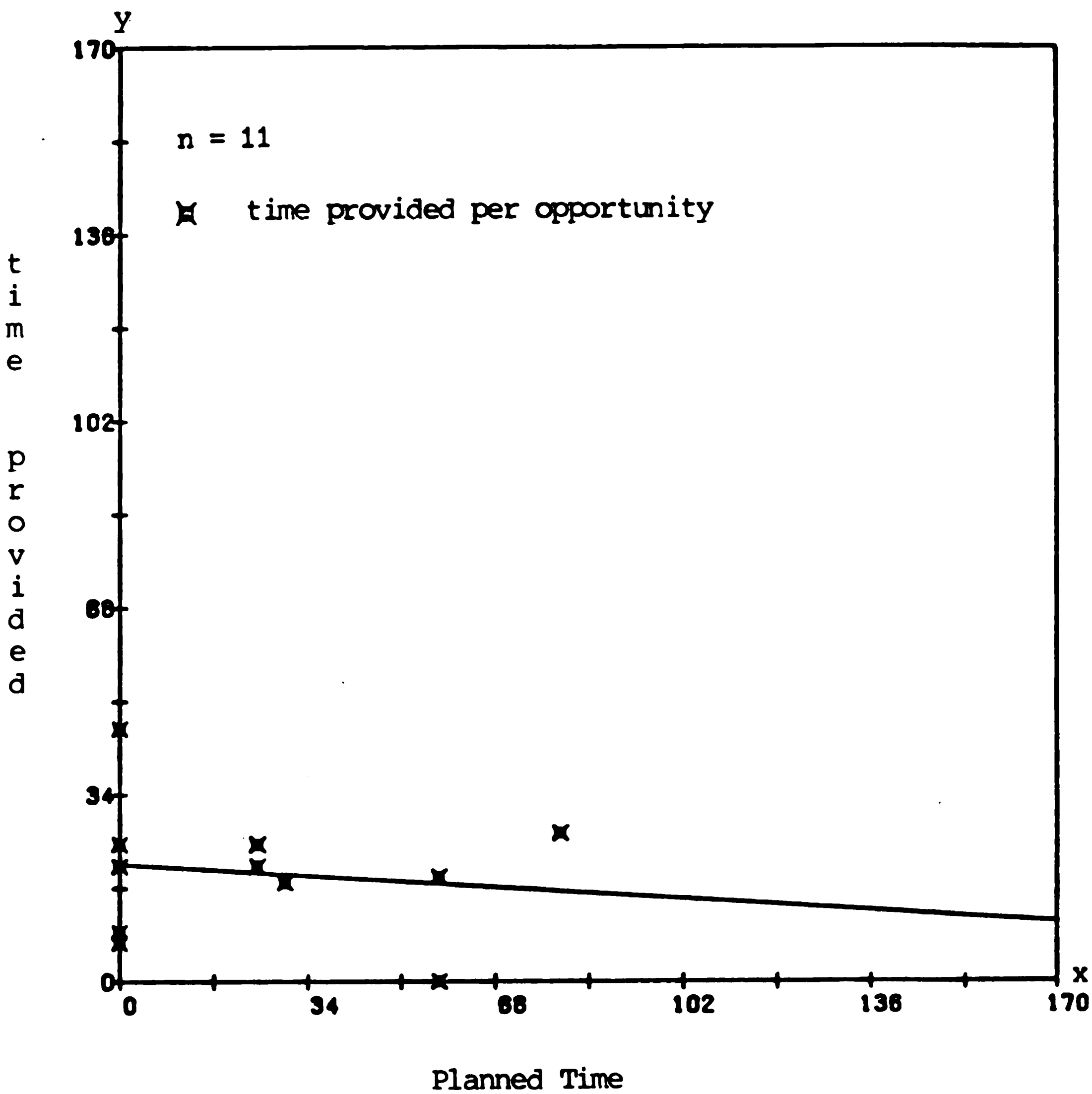

Figure 6.20

Regression Model for Teacher 2's Reading Time Decision Pattern

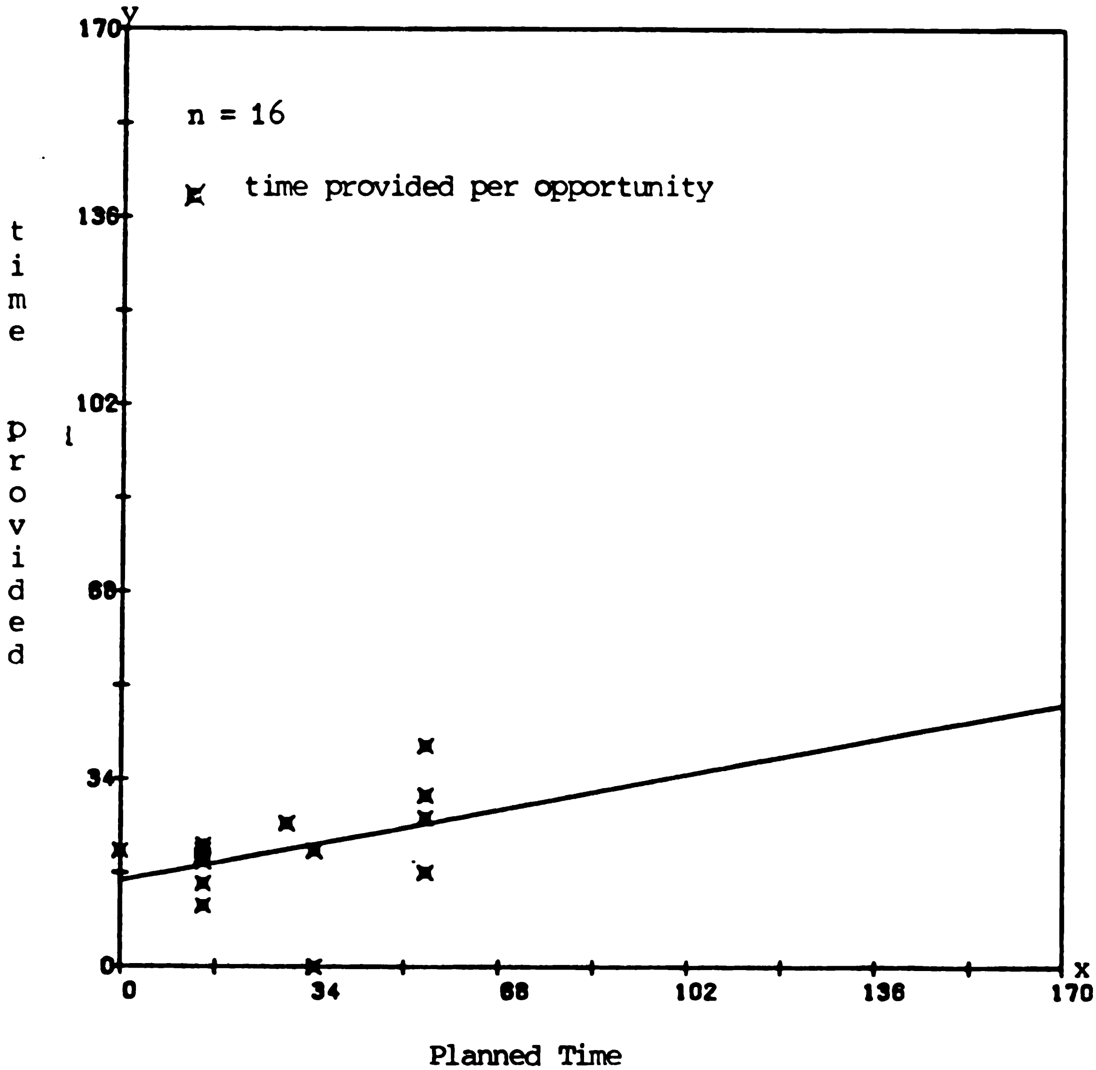

Figure 6.21

Regression Model for Teacher 4's Reading
Time Decision Pattern

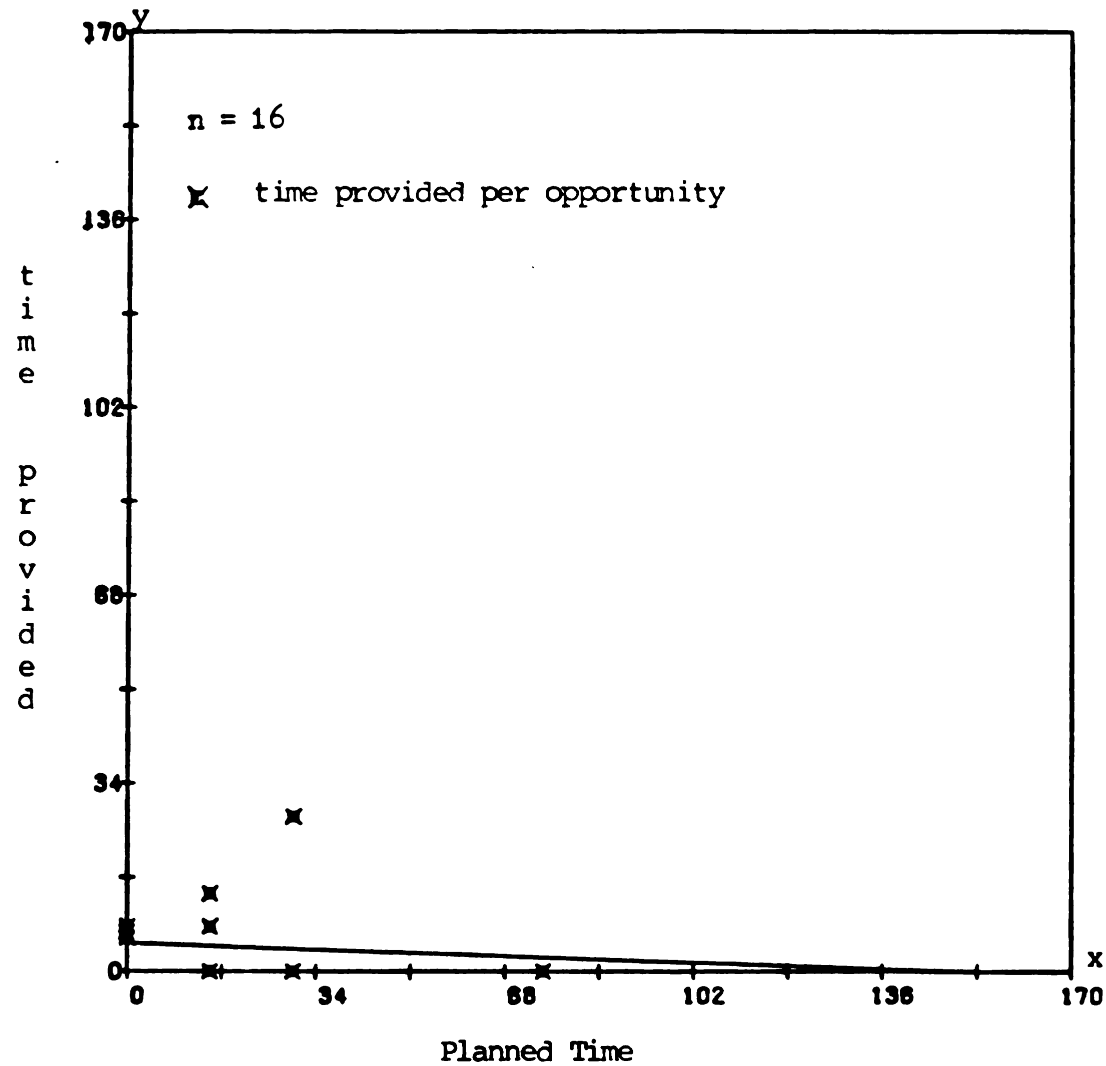

Figure 6.22

Regression Model for Teacher 6's Reading Time Decision Pattern

large differences suggest that planned time allocations were shortened substantially, from eighty-one to ninety-seven percent.

These findings suggest that the planned Reading time allocations of Teachers 1, 2, 4 and 6 had little or no effect on the time they provided for Reading.

Math

The results of the Pearson correlation analyses for Math are shown in Table 6.7. A positive correlation was found for Teachers 2, 3 and 5. The positive correlations suggest that there was a positive relationship between the time these teachers allocated to Math in their plans and the time they provided for Math in their classrooms.

Teachers 2 and 3 had very high P/A correlations. These findings indicate that the relationship between their planned and actual time allocations to Math was extremely strong. The P/A correlations for Teacher 5 was very low indicating that the relationship between his/her planned and actual time allocations to Math was very weak.

A negative correlation was found for Teachers 4 and 6. These negative correlations suggest that there was a negative relationship between their planned time allocations for Math and the time they provided for Math in the classroom.

The correlations for both Teachers 4 and 6 are low, however. This indicates that the relationship between the planned and actual time allocations to Math was not very strong.

Through regression analyses, we found that the time decision patterns for Teachers 2, 3 and 5 could best be described by regression models which resemble Theoretical Model 6. A regression model similar to Theoretical Model IX best describe the time decision patterns for

Table 6.7

Pearson Correlations Between Planned and Actual Time Allocations of Teachers for Math

Teacher	r	n
1	N/A	1
2	.91	14
3	.94	9
4	-.49	8
5	.27	10
6	-.14	9

Teachers 4 and 6.

In Table 6.8 regression coefficients of the empirical model for each teacher are shown. The ninety-five percent $\hat{\beta}_0$ confidence interval for Teachers 2, 3 and 6 includes zero. We cannot be certain then that b_0 for these teachers is different from zero. Since the ninety-five percent $\hat{\beta}_0$ confidence interval for Teachers 4 and 5 does not include zero, we are ninety-five percent confident that b_0 for these teachers is not equal to zero.

The ninety-five percent $\hat{\beta}_1$ confidence interval for Teachers 2 and 3 includes one; therefore, we cannot be certain that b_1 for these teachers does not equal one. The ninety-five percent $\hat{\beta}_1$ confidence interval for Teachers 4-6 does not include one; therefore, we are ninety-five percent certain that b_1 for these teachers does not equal one. Thus, we are quite certain that the regression models for only Teachers 4 and 5 accurately describe their time decision patterns for Math.

Table 6.8

Regression Coefficients and 95% Confidence Interval for Math by Teacher

Teacher	n	b_0	b_1	95% Confidence Interval b_0	95% Confidence Interval b_1
1	1	N/A			
2	14	9.91*	.75#	-6.0 - 25.9	.53 - 9.6
3	9	4.69*	.78#	-5.8 - 15.2	.54 - 1.0
4	8	46.61	-.43	13.8 - 79.5	-1.20 - .33
5	10	53.44	.13	32.8 - 74.1	-.26 - .52
6	9	31.75*	-.14	-5.8 - 69.3	-1.06 - .77

*May be zero

#May be one

The scatter plot for Teacher 2 is shown in Figure 6.23. It shows that on several occasions, Teacher 2 provided almost exactly the amount of time to Math as (s)he had planned. But on all other occasions, (s)he provided less time; in most cases, however, the difference between his/her planned and actual time allocations was not large. And on only a few occasions did Teacher 2 provide time for unplanned Math activities. In general then, the actual time Teacher 2 provided for Math activities was often very similar to the time (s)he had planned for them.

The "best fitting" regression line which summarizes this time decision pattern for Teacher 2 is shown in Figure 6.23. It indicates that the time decision pattern was linear and conforms to Theoretical Model 6. But, since the $\hat{\beta}_0$ and $\hat{\beta}_1$ confidence intervals include zero and one respectively, we are not certain whether this regression model accurately describes his/her Math time decision pattern. With this in mind, we will discuss Teacher 2's regression model.

The slope of the regression line is .75. A slope of this size indicates that on the average, the time Teacher 2 provided for Math activities was very similar to the time (s)he had planned for them. The size of the Pearson correlation (.91) and the small size of the slope difference (.25) support this conclusion.

The results of the Pearson correlation and regression analyses of the sample Math data for Teacher 2 lead to the conclusion that his/her planned time allocations for Math had a strong effect on his/her actual time allocations for Math.

The scatter plot for Teacher 3 is shown in Figure 6.24. It shows that on at least one occasion (s)he provided a little more time to a

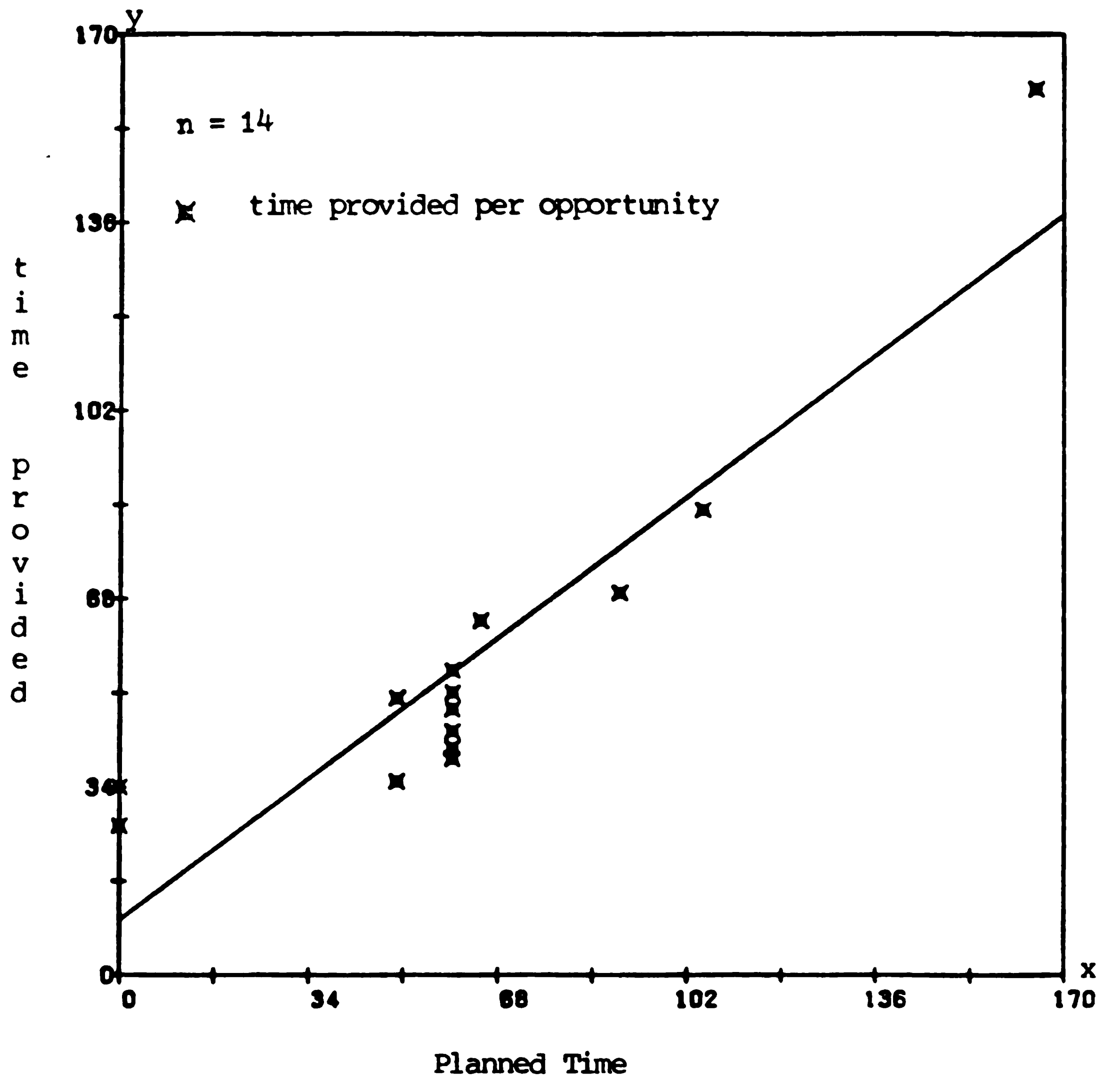

Figure 6.23

Regression Model for Teacher 2's Math
Time Decision Pattern

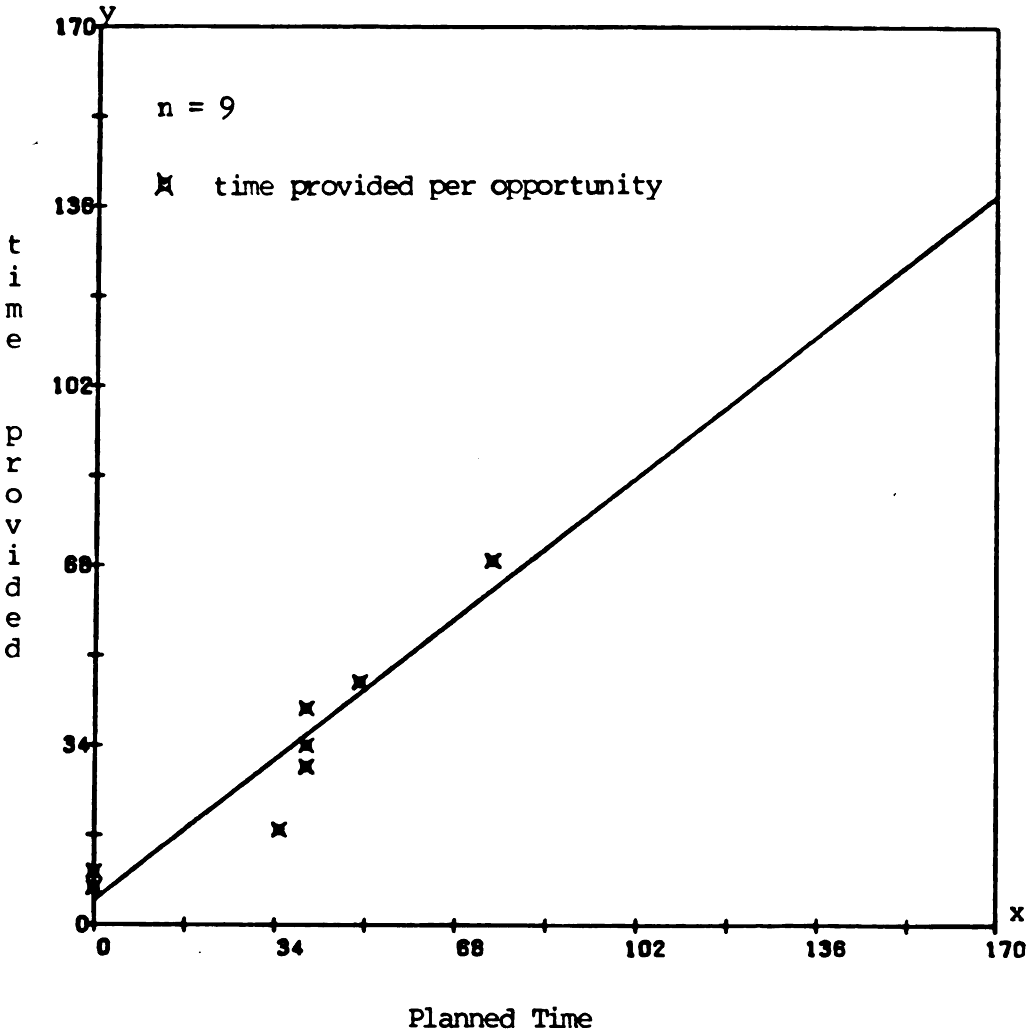

Figure 6.24

Regression Model for Teacher 3's Math
Time Decision Pattern

Math activity than (s)he had planned. For most of the other Math activities, however, Teacher 3 provided just slightly less time than (s)he had planned. Furthermore, Teacher 3 provided only a small amount of time to a few unplanned activities. It appears from the scatter plot then that Teacher 3's planned and actual time allocations were linearly related. The .94 Pearson correlation for this relationship is very high indicating that the relationship was extremely strong.

The "best fitting" regression line shown in Figure 6.24 summarizes the time decision pattern for Teacher 3 in Math. But since the $\hat{\beta}_0$ and $\hat{\beta}_1$ confidence interval includes zero and one respectively, we cannot be certain that this regression model accurately describes the Math time decision pattern for Teacher 3. With this in mind, we will discuss Teacher 3's regression model.

The slope of the regression line is very large (.78) and indicates a strong linear time decision pattern which conforms to Theoretical Model 6. The slope difference indicates that on the average, the time Teacher 3 provided for Math activities was only about twenty-two percent less than (s)he had planned.

It appears from the results of the Pearson correlation and regression analyses of Teacher 3's sample Math data that his/her planned time allocations for Math had a strong effect on his/her actual time allocations for Math.

A scatter plot of the sample Math data for Teacher 4 is shown in Figure 6.25. It shows that (s)he provided less time for all Math activities than (s)he had planned; typically, (s)he provided the most time to activities with shorter planned time allocations and the least time to activities with the longest planned time allocations. There appears then to be an inverse relationship between Teacher 4's planned and actual time allocations; but, Teacher 4 consistently provided about thirty minutes to Math activities whose planned time allocations were around forty minutes. This practice seems to suggest that his/her actual time allocations were at least moderately affected by his/her planned time allocations.

A "best fitting" regression line summarizing this time decision pattern is shown in Figure 6.25. The slope of the regression line is $^{-}.43$. The small size of the slope suggests that time (s)he provided to planned Math activities varied unsystematically with variations in planned time allocations. The slope difference indicates that Teacher 4's actual time allocations were on the average about fifty-seven percent shorter than his/her planned time allocations.

The fact that the slope is negative indicates that overall, Teacher 4 provided the most time for Math activities with a short planned time allocation and the least time for Math activities with long planned time allocations. This pattern is apparent from the scatter plot. The low Pearson correlation ($^{-}.49$) suggests, however, that the negative relationship was not very strong.

The scatter plot appears to tell a different story. In fact, it appears from the scatter plot that Teacher 4 consistently provided just slightly less time for Math than (s)he had planned. Based on the scatter plot then, we conclude that Teacher 4's planned time allocations for Math had a fairly strong effect on his/her actual time allocations for Math.

A scatter plot for Teacher 5 is shown in Figure 6.26. It shows that the time Teacher 5 provided for planned Math activities differed

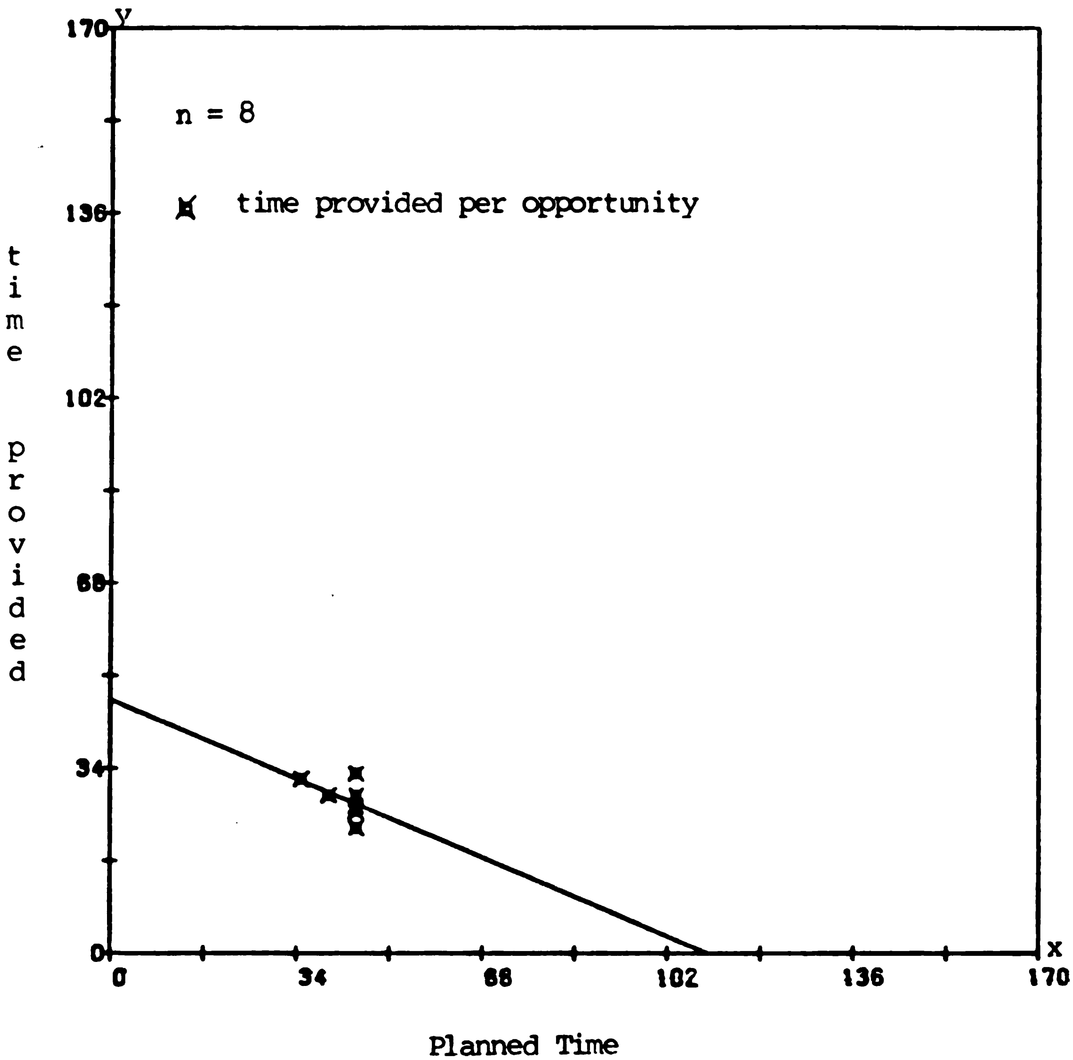

Figure 6.25

Regression Model for Teacher 4's Math
Time Decision Pattern

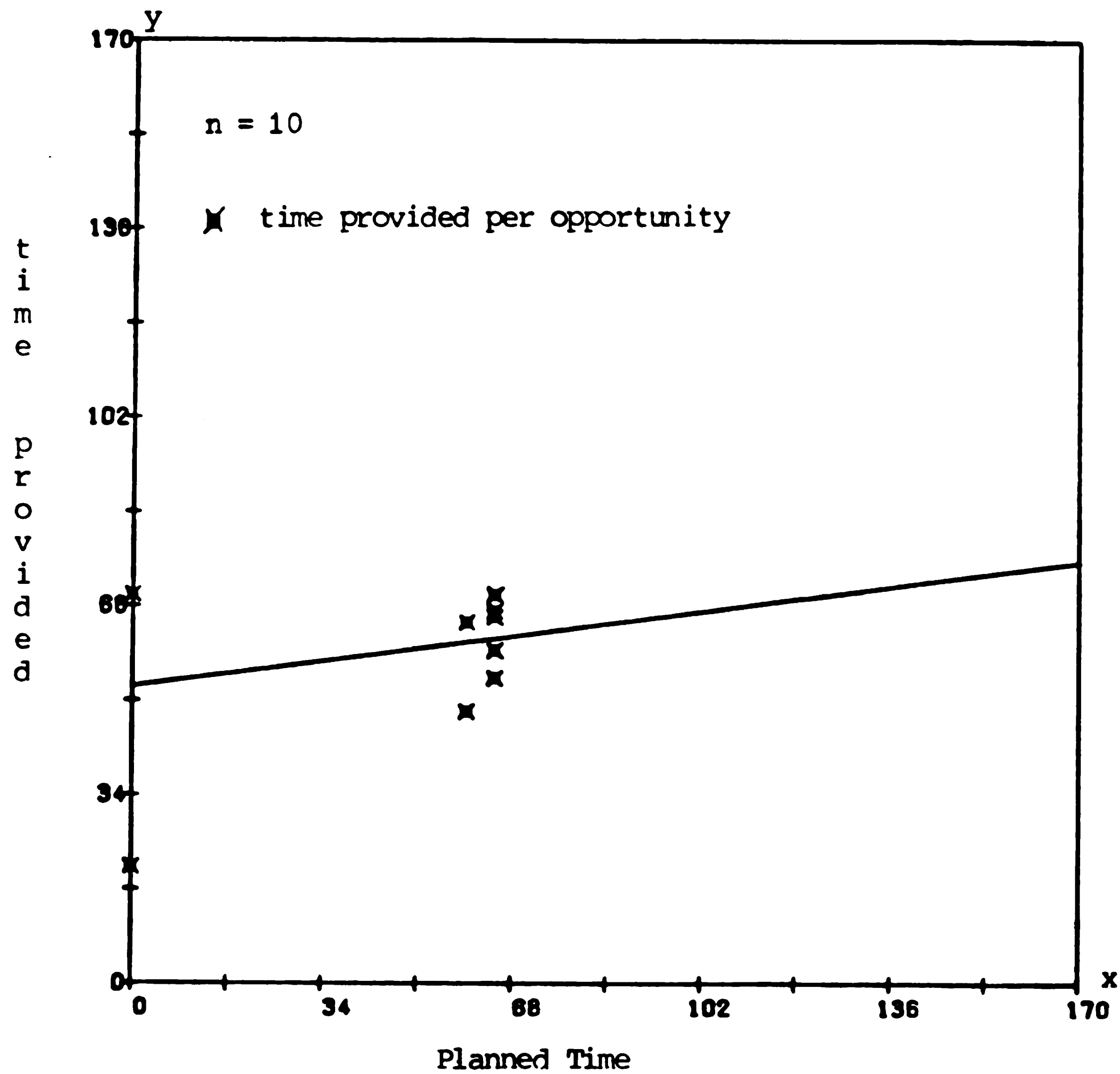

Figure 6.26

Regression Model for Teacher 5's Math
Time Decision Pattern

from his/her planned time for them, but not by very much; sometimes (s)he provided more time for Math activites than (s)he had planned and sometimes (s)he provided less time than (s)he had planned. From the scatter plot it appears that (s)he allocated about sixty-eight minutes to most of his/her planned Math activities. The time Teacher 5 provided for planned Math activities appears then to have been quite closely related to the time (s)he had planned for them. Some Math activities which occurred, however, were unplanned. These were the only instances in which Teacher 5's planned time allocations appear to have had no relation to his/her actual time allocations. The time Teacher 5 provided for one of the unplanned activities was as great as the time (s)he provided to some planned activities. This may indicate that Teacher 5 tended to provide about the same amount of time to Math activities no matter how much time (s)he allocated to them in his/her plan. We cannot conclude on the basis of only one example, however, that such a pattern describes Teacher 5's actual time allocation practice.

The "best fitting" regression line which summarizes this time decision pattern is shown in Figure 6.26; it has a very small slope (.13). Such a small slope suggests that the amount of time Teacher 5 provided for Math activities differed almost randomly from the time allocated to them. Thus, the best estimate of the time (s)he provided for Math is the average of the actual time allocations. This finding implies that there was little or no relationship between the time Teacher 5 provided for Math activities and the time (s)he had planned for them. The size of the Pearson correlation supports (.27) this notion by showing that the relationship indicated by the slope was extremely weak.

Both of these findings conflict with the conclusion we drew from the scatter plot that most of Teacher 5's planned and actual time allocations appeared to have been quite closely related.

One reason that the scatter plot, Pearson correlation and regression analyses appear to conflict is that Teacher 5's planned time allocations were all grouped closely together about the same time, and his/her actual time allocations did not differ very much from the planned time allocations. Evidently, the points on the scatter plot are so close together that they act essentially as one point. Thus, it is difficult to draw a straight line through them which meaningfully describes their true relationship. This problem is compounded by the fact that Teacher 5 provided time for several unplanned activities. The unplanned activities then became the "second" point for the regression line. Because Teacher 5 provided about the same amount of time for the unplanned activities as (s)he provided for the planned ones, the slope of the line was close to zero. It appears then that the slope of the regression line was unduly influenced by the time Teacher 5 provided for unplanned activities as well as the lack of planned activities of different lengths. Because Teacher 5 used unplanned activities very sparingly, we are not willing to accept the results of regression analyses as portraying Teacher 5's time allocation pattern.

One way in which the slope does describe the nature of the relationship is, it indicates that the amount of time Teacher 5 provided for planned activities was very close to the amount of time (s)he had planned for them.

The scatter plot seems to be a better source then for determining whether or not there was a relationship between Teacher 5's planned and actual time allocations. The fact that Teacher 5 provided about the same amount of time to most of his/her planned Math activities as (s)he had planned suggests that his/her planned and actual time allocations were strongly related.

On the basis of the scatter plot then, we conclude that Teacher 5's planned time allocations had a strong effect on the time (s)he provided for Math activities.

The scatter plot for Teacher 6 is shown in Figure 6.27. Only a few times did Teacher 6 provide more time for Math activities than (s)he had planned; (s)he provided less time to all other Math activities. On several occasions, Teacher 6 provided a similar amount of time for Math activities as (s)he had planned, but the amount of time (s)he provided for Math activities with planned time allocations of sixty minutes differed unsystematically from what (s)he had planned for them. A similar pattern occurred with the two planned Math activities whose planned time allocations were just less than thirty-four minutes; one was provided zero time while the other was provided more than thirty-four minutes. This time allocation pattern suggests that the relationship between Teacher 6's planned and actual time allocations was very weak or nonexistent.

The "best fitting" regression line which summarizes the time decision pattern for Teacher 6 has a slope of $^{-}.14$. The slope is shown in Figure 6.27. This model may not accurately describe his/her time decision pattern, however, because the ninety-five percent confidence interval for $\hat{\beta}_0$ includes zero. The conclusions drawn from the regression model may not be accurate then.

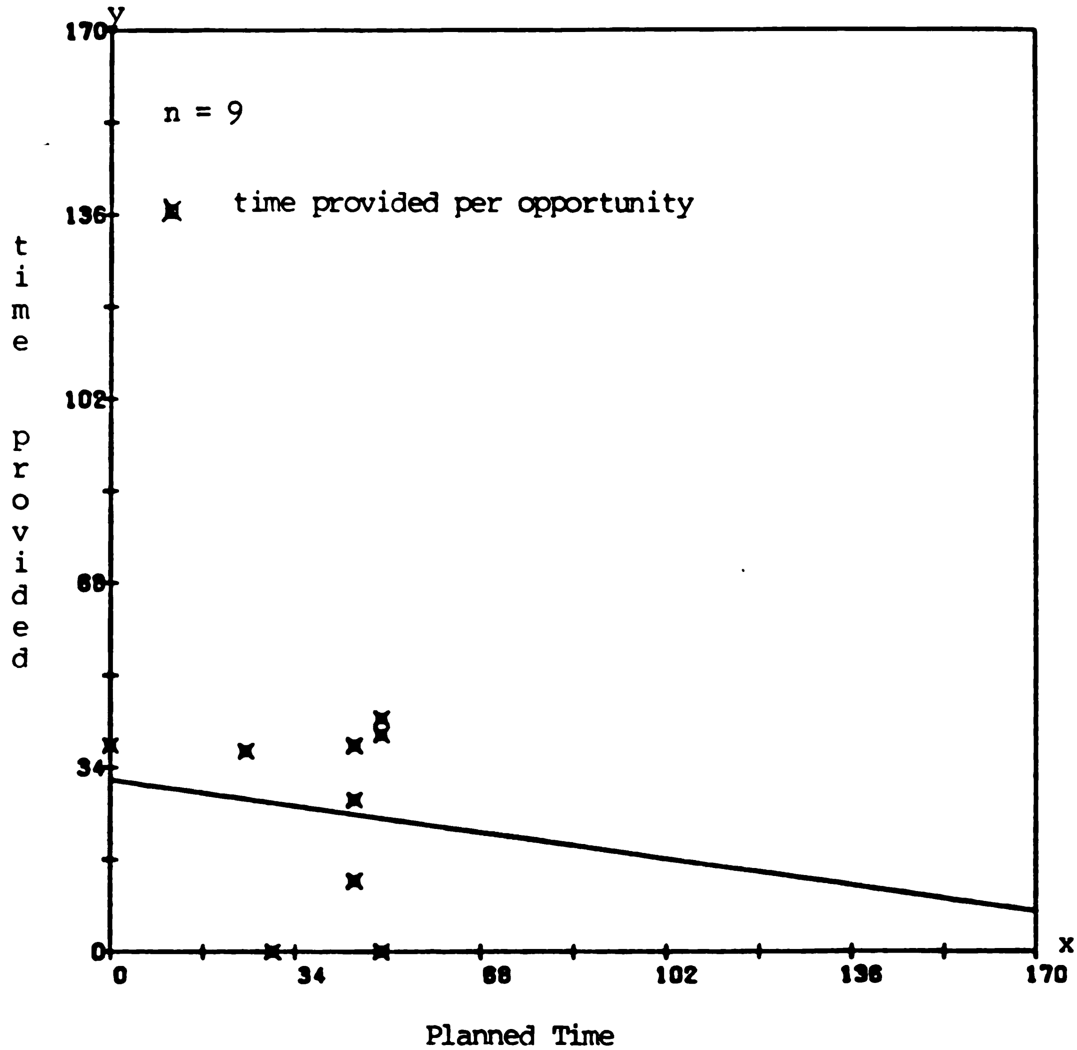

Figure 6.27

Regression Model for Teacher 6's Math
Time Decision Pattern

Such a small slope suggests that variations in actual time allocations did not follow variations in planned time allocations. The size of the slope leads us to conclude that overall the amount of time Teacher 6 provided to Math activities differed unsystematically from his/her planned time allocations for them. The Pearson correlation supports the conclusion that the relationship between Teacher 6's planned and actual time allocations was very tenuous.

The fact that the slope is negative indicates that Teacher 6 had a tendency to provide more time to the shorter planned Math activities than (s)he provided to the longer planned ones. This conclusion is open to question, however, since this practice only occurred twice.

Because the slope and Pearson correlation are so low, we conclude that Teacher 6's planned time allocations to Math had very little direct effect on his/her actual time allocations to Math.

Summary

Language Arts. Pearson correlations for Teachers 1-3, 5 and 6 were positive; the correlation for Teacher 4 was negative. The correlation for Teacher 1 was high while the correlation for Teacher 3 was moderate. The correlations for the other teachers were low. Thus, the correlations for four out of six teachers suggest that the relationship between their planned and actual time allocations was not very strong.

Regression analyses suggest that the time decision patterns of Teachers 1-3, 5 and 6 for Language Arts can be described by Theoretical Model 6 while the time decision pattern for Teacher 4 can be described by Theoretical Model IX. For Teachers 3 and 5, however, the ninety-five percent confidence interval for $\hat{\beta}_0$ includes zero. Thus, we cannot be certain that their regression models accurately describe their true time decision patterns. We are ninety-five percent confident, however, that the regression models for Teachers 1, 2, 4 and 6 accurately describe their time decision patterns since the $\hat{\beta}_0$ and $\hat{\beta}_1$ confidence interval for these models do not include zero and one respectively.

The large size of the slope for Teacher 1 (.67) suggests that his/her actual time allocations for Language Arts were strongly affected by his/her planned time allocations to Language Arts. The slopes for Teachers 3 (.47) and 6 (.43) were much lower than the slope for Teacher 1. Slopes of this small size suggest that the actual time allocations for Language Arts by these teachers were only moderately affected by their planned time allocations to Language Arts. The slopes for Teachers 2, 4 and 5 were even lower. Low slopes such as these indicate that the effect of the planned time allocations by these teachers on their actual time allocations was small.

All teachers provided time for unplanned Language Arts activities. In general, Teachers 1-2 and 5 provided less time to planned activities than they had intended. Teacher 4 provided more time to about half of his/her planned activities and less time to the other half. Teacher 6 provided about the same amount of time to planned activities that (s)he had intended.

Reading. Pearson correlations for Teachers 3-5 were positive. The correlations for Teachers 1, 2 and 6 were negative. Only Teachers 3 and 5 had high correlations. The correlations for Teacher 4 were low while the correlations for Teachers 1, 2 and 6 were very low. Thus, the correlations for only Teachers 3 and 5 suggest a strong relationship; and the correlations for Teachers 1, 2, 4, and 6 suggest very weak or non-existent relationships.

Regression analyses suggest that the time decision patterns for Teachers 3-5 could be described by Theoretical Model 6 while the time decision patterns for Teachers 1, 2 and 6 could best be described by Theoretical Model IX.

We are ninety-five percent certain that the regression models for Teachers 1, 2 and 4 accurately describe their time decision patterns since $\hat{\beta}_0$ and $\hat{\beta}_1$ confidence intervals do not include zero and one respectively. Since the $\hat{\beta}_0$ confidence interval for Teachers 3 and 6 include zero and the $\hat{\beta}_1$ confidence interval for Teacher 5 includes one, we cannot be certain that their regression models accurately describe their time decision patterns for Reading.

The large size of the slope for Teachers 3 (.73) and 5 (.76) suggests that their actual time allocations for Reading were strongly affected by their planned time allocations to Reading. The very small size of the slope (less than .20) for Teachers 1, 2, 4 and 6 suggests that their actual time allocations to Reading were weakly affected by their planned time allocations to Reading.

Teachers 1-4 and 6 typically provided less time for Reading activities than they planned. Teacher 5 provided nearly the same amount of time to Reading activities that (s)he had planned. All teachers provided time for unplanned Reading activities.

Math. Pearson correlations[8] for Teachers 2, 3 and 5 were positive; correlations were negative for Teachers 4 and 6. The correlations for

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[8]There was no correlation for Teacher 1 since (s)he did not teach Math.

Teachers 2 and 3 were very high, indicating that the relationships between their planned and actual time allocations for Math were extremely strong. The correlation for Teacher 4 was low while the correlations for Teachers 5 and 6 were very low. These findings indicate that the relationships for Teachers 4-6 were very weak or nonexistent.

The results of regression analyses suggest that the actual time allocations to Math by Teachers 4 and 5 were not very strongly affected by their planned time allocations to Math. But, a review of the scatter plots for Teachers 4 and 5 reveals that they consistently provided about the same amount of time they had planned to every planned Math activity. Thus, we conclude from the scatter plots that Teachers 4 and 5 actual time allocations to Math were substantially influenced by their planned time allocations to Math.

The $\hat{\beta}_0$ ninety-five percent confidence interval for Teachers 2 3 and 6 includes zero and the $\hat{\beta}_1$ confidence interval for Teachers 2 and 3 includes one. Therefore, we are not certain whether the regression models for these teachers accurately describe their time decision pattern for Math.

Teachers 2-4 and 6 typically provided less time to Math activities than they had planned. Teacher 5 provided about the same amount of time (s)he had intended.

Teacher 4 did not provide time for unplanned Math activities. All other teachers provided time to some unplanned Math activities.

CHAPTER VII

SUMMARY, CONCLUSIONS AND IMPLICATIONS

Introduction

Findings on the effect of time on achievement suggest that the more time a student spends on instructional pursuits, the more (s)he learns (BTES, 1976).

It is generally understood that a student's total active learning time is a function of opportunity for learning and perseverance (Carroll, 1963). Further, a student's opportunity to learn is affected by teacher decisions regarding use of time; thus, the allocation of time in the classroom (opportunity) is a most critical practice in the teaching/learning process.

What factor(s) influence teacher decisions regarding use of time? Findings from several studies indicate that teacher instructional practices are influenced by their plans (Smith and Sendelbach, 1979; Peterson and Clark, 1978; Morine and Vallance, 1975; Morine-Dershimer, 1979; Zahorik, 1970; and Clark and Yinger, 1979). Time allocations are a part of those plans.

It is reasonable to assume then that teachers' planned time allocations exert a major influence on their actual time allocations. This assumption cannot be supported by empirical evidence however: to date, there have not been any studies undertaken to investigate the relationship between teachers' planned and actual time allocations. Therefore, the purpose of this study was to investigate teachers' planned and actual time allocations and describe the relationship between them; we have termed this relationship a teacher's "time decision pattern".

The study addressed four major questions:

(1) What is the general pattern of teachers' planned time allocations?

(2) What is the general pattern of teachers' actual time allocations?

(3) How do teachers' planned and actual time allocations compare?

(4) What linear model describes the relationship between a teacher's planned and actual time allocations?

These questions were investigated through observations in the classrooms of six different elementary teachers and through self-reports (in the form of written lesson plans) of their time and content allocations.

Each teacher was observed either eight or nine full days over a period of twelve consecutive weeks. Teachers' daily written lesson plans for the entire twelve weeks were collected, but only the lesson plans which corresponded to the observed days were used in this study.

All observational and plan data were numerically coded for each teacher. Information that was coded consisted of the beginning and ending times of each class activity and its content, e.g., 9:00-9:45 Math, 9:45-10:30 Reading, etc. The beginning and ending times of an activity formed what we called an interval. We defined a planned interval as the length of time in minutes a teacher allocated in his/her plan to one of the seven different content areas; and an observed interval was defined as the length of time in minutes a teacher provided for an activity in a content area. The value of a planned interval was called a planned time allocation and the value of an observed interval was called an actual time allocation.

Each teacher's observed intervals were linked with his/her planned intervals to form matched intervals; each matched interval represented a single case for the purposes of analyses.

For analyses, the value of the observed and planned interval of each matched interval was compared. Three statistical techniques were employed in these analyses: (1) measures of central tendency; (2) measures of variability; and (3) Pearson correlation.

Prior research has not identified a theoretical model to describe the relationship between planned and actual time allocations; in the absence of such a model then, as a first approximation, we used a linear model called the simple linear regression model of y on x. It is as follows: $Y_i = \beta_0 + \beta_1 X_1 + \varepsilon_i$ [i = 1, 2, ..., n]. By use of this mathematical model we specified various theoretical models that could possibly represent relationships between the two variables under study.

To determine whether or not teachers' planned intervals were linearly related to their observed intervals, we submitted the data to regression analysis using the linear regression equation, $\bar{Y} + b_0 + b_1 x$. Planned time allocation was the independent variable and actual time allocation was the dependent variable.

The models describing the relationship between these variables were then compared to the theoretical models in order to learn if the theoretical models are appropriate for describing teachers' time decision patterns.

The theoretical models and results and conclusions drawn from data analyses are summarized in this chapter. Implications for practice and future research are presented at the end of this chapter.

Summary and Conclusions

Theoretical Models

We identified fifteen different theoretical models that result from use of the linear regression model. Analysis of the slope and intercept of each model revealed however that nine models (Models I-IX) could not represent time decision patterns of practicing teachers because they suggested situations which could not occur. These improbable situations are:

(1) Most dependent variables are zero (i.e., no time elapsed during the school day);

(2) At least one dependent variable is less than zero (i.e., negative time);

(3) An irrational decision-making pattern for use of time compared to planned use of time.

We concluded that the other six theoretical models (Models 1-6) were capable of representing time decision patterns of practicing teachers. Each of these models was shown to represent a unique time decision pattern which resulted from a specific pattern of plan modification.

Plan modification is a teacher practice by which (s)he modifies his/her planned time allocations. Three general patterns were outlined and discussed. They were: (1) proportional modification; (2) constant modification; and (3) constant/proportional modification.

In proportional plan modification, planned time allocations are systematically modifed by some percentage. The distinguishing characteristic of constant plan modification is that planned time allocations are modifed by the same (constant) amount of time. And, planned time allocations are modified by both a constant and proportional amount of time in the constant/proportional plan modification pattern.

We concluded that in order for a model to represent teachers' time decision patterns over a full day or multiple days, it had to show that either $\varepsilon y = \varepsilon x$ or that $\varepsilon y > \varepsilon x$. The term εx is defined as the total amount of time allocated to planned activities for the day; it can never be greater, but it could be less, than the available school time. The term εy is defined as the total amount of time a teacher actually provides for activities. It must always equal the available school time. Only Models 1, 2, 2A, 3, 4, and 6 were found to meet these qualifications ($\varepsilon y = \varepsilon x$ or $\varepsilon y > \varepsilon x$). Thus, these models can describe a full day(s) time decision pattern for any teacher.

Models 4A, 5 and 6A show that $\varepsilon y < \varepsilon x$. Since this term indicates that less than the AST was used, we concluded then these models can only represent teachers' time decision patterns over a part of a day or parts of days.

After analyzing the time decision patterns described by Models 1, 2, 2A, 3, 4, and 6 we concluded that Model 6 is the most likely candidate to represent the time decision pattern of practicing teachers: it appears to be the only model which accounts for all the available school time while at the same time summarizing not only the type of time decision pattern teachers are thought to follow (linear) but also the different ways teachers probably modify—proportional, constant, constant/proportional—their planned time allocations each day.

<u>General Pattern of Teachers' Planned Time Allocations</u>

We found that teachers allocated on the average just over eighty-three percent of the available school time (AST). Since each teacher had about 360 minutes available each school day, this finding indicates that they developed plans for a little less than five of the six hours available each day.

Generally, teachers allocated nearly one-half (47.9 percent) of AST to activities in the academic content areas and more than one-third (35.3 percent) to activities in the non-academic content areas. They allocated about the same proportion of AST (9.4 - 13.3) to each of the academic content areas. Teachers intended to use, then, only about one-half of the school day for academic pursuits.

There were only small differences between upper and lower grade level teachers in the proportion of AST each allocated. Apparently then, grade level, curricula and student differences had little effect on how much AST teachers in different grade levels allocated to academic and non-academic content areas.

There were large differences between teachers in most content areas in the average time each allocated to activities. These large differences may reflect differing strategies, differing teacher perceptions of student aptitudes and needs and different curricula objectives. It may also reflect differing placement of activities in relation to Breaks such as recess and lunch. Smith found that the activity which occurred just before schoolwide scheduled events such as recess and Breaks normally lasted a different length of time than if the same activity did not occur just prior to one of these Breaks (Smith, 1977). Teachers in this study may have differed from each other in the placement of activities in relation to schoolwide scheduled events.

The findings on the proportion of AST allocated supports the findings of other researchers that teachers commonly predetermine how they intend to use time in the classroom (Smith, 1977; Clark and Yinger, 1979; Clark and Elmore, 1979; Morine-Dershimer, 1977; Smith and Sendelbach, 1979; Yinger, 1979). Teachers in this study, however, left nearly seventeen percent of AST on the average unallocated in their plans. This represents almost one hour per day per teacher. An incomplete written plan does not necessarily indicate the absence of a planned use for AST however, as Morine-Dershimer found (Morine-Dershimer, 1977). It is possible that teachers in this study behaved similarly to teachers in her study and had a mental image of how they intended to use AST.

There were large variations in time teachers allocated to activities within content areas. Also the variance within content areas differed greatly between teachers.

The findings on variance suggest that in the content areas where the greatest differences in variance occurred, teachers may have differed in the ways they intended to conduct their classroom activities. This conclusion is based on the assumption that instructional strategies employed during intervals of one length may be different from instructional strategies employed during intervals of other lengths. For example, small group activities may require more time—maybe thirty-five to forty-five minutes—whereas an individual Reading activity may require a fairly short amount of time, say twenty to thirty minutes.

Extending this idea a step further, teachers whose intervals were all of a similar length, i.e., a low standard deviation, may have relied on one or only a few instructional strategies while teachers whose intervals were more varied may have relied on a number of different instructional strategies. So, interval variance may indicate variety of instructional approach.

General Pattern of Teachers' Actual Time Allocations

As a group, teachers provided slightly more than forty-six percent of AST for activities in the four academic content areas; in other words, less than one-half of AST was used for academic pursuits.

Teachers provided about 34.3 percent of AST to the areas of Transition and Breaks. Thus, about one-third of each school day was used for non-academic pursuits.

There were sizeable differences between upper and lower grade teachers in the proportion of AST provided for the different content areas. The differences may reflect differing goals and needs common to different grade levels. For example, lower grade teachers provided nearly two times more AST to Reading than did upper grade teachers. And, upper grade teachers provided nearly two times more AST to Science than did lower grade teachers.

In general there were substantial differences between teachers within content areas in the proportion of AST they provided. In several content areas, proportion of AST provided differed between teachers by a factor of ten. This occurred in Reading and Science.

Gnerally, we found differences between content areas both in the number of opportunities teachers provided and in the mean opportunity time; the differences fell within a narrow range however. Except for Transitions, opportunities in all content areas lasted from one-third to three-fourths of an hour.

Differences were found between upper and lower grade teachers in the number of opportunities each group provided within content areas as well as in the mean opportunity time. Differing teacher responses to different curricula, student needs and aptitudes may explain grade level differences on this dimension.

Differences between teachers in mean opportunity time were not extensive. We found that in each content area four or five teachers often provided about the same time per opportunity while the other one or two teachers provided much more or less time per opportunity. But, most teachers differed substantially from one another in the number of opportunities they provided for each content area. Since the mean time per opportunity did not differ very extensively between teachers, the number of opportunities was an important factor in the total time provided for the particular content.

Large variance was found across teachers in the time they provided for opportunities within most content areas. Opportunities typically varied in the range of ten to twenty minutes. Opportunity varience within content areas also differed in a similar way between teachers. These findings suggest that teachers find it necessary to alter their planned time allocations, but only within a particular time range.

The findings on variance may be explained in several ways. Teachers may have adjusted their planned time allocations in response to differing time needs of student and content and/or they may have used content areas for different purposes. For instance, short activities of five to ten minutes may have been used to fill time which intervened between the end of one activity and the start of another activity. Or, long activities in excess of sixty minutes may have been used so that teacher activities such as checking papers, planning for a future activity or having discussions with individual students could occur.

Teachers may use one content area more often than others for a particular purpose. This may explain why Language Arts and Reading generally had shorter intervals than Math or Science.

Planned Time Allocations Compared to Actual Time Allocations

The content areas of Reading and Math were provided a slightly smaller proportion of AST than was allocated to them while all other content areas were provided a larger proportion of AST. Generally, the increase was very small however. An exception was Transitions and Breaks; taken together, the proportional share of AST for these areas increased from 18.8 percent to 34.3 percent. The proportional share of AST for all other content areas combined increased only from 64.3 percent to 65.7 percent. Comparison of the data for individual teachers shows that their decisions about time generally followed this same pattern.

Only a very small part of the overall increase in time for Transition and Breaks can be attributed to the decrease in the proportion of AST to other content areas. The greatest part of the increase must be attributed to unallocated time.

Several reasons may account for the way in which teachers used unallocated time. Without exception, teachers allocated very little time for Transitions; since Transitions are an essential activity, teachers found it necessary to provide for them.

For the most part, Breaks require little or no planning. This characteristic makes it an ideal activity to use when extra time becomes available. It also is an activity which allows teachers and students to obtain relief from the pressures of the classroom.

Comparisons of planned and actual time allocations suggest that a strong relationship existed between teachers' planned and actual use of time in the classroom. Planned time allocations functioned then as more than just a loose or sketchy outline of a teacher's intentions as suggested by Smith and Sendelbach (1979). Instead, they served as quite specific guidelines for the quantity of time teachers provided for each content area. The findings of Morine-Dershimer (1977) support this notion.

The similarities between planned and actual time allocations suggest that if educators and policy makers wish to influence how time is used in the classroom, their efforts should be focused, at least initially, on teachers' planning decisions.

The strong relationship between planned and actual time suggests that the dramatic differences between individual teachers within content areas in the proportion of AST each provided may not be explained by differing teacher reactions to differing student behaviors and events in the classroom; rather, teachers' planned time allocations alone may account for the differences. In other words, whatever time the teacher planned, that is the time that was provided no matter what transpired in the classroom. If teachers are found to behave in this way—Zoharik suggests that teachers who plan are insensitive to student needs—then training programs must be developed or refined to help teachers learn to plan in a way that increases, not decreases, their sensitivity to student needs. Peterson and Clark (1978) found that teachers whose planning decisions dealt with instructional processes appeared to be more responsive to student needs. Perhaps teachers ought to be trained to plan in this way.

While time was generally provided to content areas in the amounts planned, teachers often used AST differently from the way they had indicated in their plans. Following are four major ways teachers departed from their plans:

(1) use of unplanned activities;

(2) failure to use planned activities;

(3) provide more but shorter activities;

(4) activities longer or shorter than planned.

Teachers extensive use of unplanned activities and their frequent failure to use planned ones suggest that teachers' plans about what specific activities to use do not have a strong effect on what activities occur in the classroom.

Perhaps teachers provided more and shorter opportunities in response to management considerations, i.e., the classroom may function more effectively with shorter activities than longer ones.

Even though actual time variance differed from planned time variance, the differences were not too large: differences fell within the range of .1 - 5.7 minutes. What this suggests is that opportunity variance is a planned event and not a consequence of classroom, content or student needs. In other words, the findings on time variance support the notion that teachers rigidly follow their plans (Zahorik, 1970; Smith and Sendelbach, 1979).

When planned and opportunity variance of individual teachers are compared, we find that variance within some content areas hardly differed at all while the variance in other content areas differed substantially. These findings suggest two conclusions: (1) when planned variations do not differ or differ only minimally from opportunity variations, then teacher use of time in the classroom may have been quite strongly influenced by the plan; and, (2) when planned variations differ substantially from opportunity variations, then teachers' use of time in the classroom may have been quite strongly influenced by events in the classroom rather than by the plan. In other words, variation may sometimes be explained by teacher perception of needs developed while planning and sometimes by teacher reaction to needs observed during instruction.

Teacher Regression Models

To confim whether an association existed between planned and actual time allocations of teachers in our study, Pearson correlation analyses were performed on the sample data. From these analyses we found that teacher's planned and actual time allocations were positively correlated. This finding suggests that changes in a teacher's planned time allocations were associated with changes in his/her actual time allocations. Visual analyses of the scatterplots support this conclusion.

Differences in correlations were found between teachers. These differences imply that any effect planned time allocations might have had on allocations of time in the classroom was much stronger for some teachers than for others.

Pearson correlation analysis on the combined sample data revealed a moderately high positive correlation. This finding indicates that in general a positive relationship existed between teachers' planned and actual time allocations. Visual analysis of the scatter plot leads to the same conclusion. Thus, teacher planned time allocations appeared to have had an effect on their actual time allocations.

We hypothesized that a positive relationship (we refer to the relationship as a teacher's time decision pattern) could be summarized by one of six different theoretical models. To determine whether or not these theoretical models are appropriate for describing a teacher's time decision pattern, we submitted the data to regression analysis using a linear regression model.

Results of these analyses revealed that the time decision pattern for each of the six teachers in our study was a positive linear one; further, the theoretical model which best describes the time decision pattern for each teacher is Model 6. This finding suggests that teachers modified their planned time allocations in a very similar way, i.e., according to the pattern suggested for theoretical Model 6. Apparently then, teachers responded in the same way to factors in the classroom that tended to precipitate plan modification.

The slope of the regression model (general model) for the combined sample data was moderately high; such a slope suggests that variations in teachers' actual time allocations tended to follow variations in their planned time allocations. The intercept of the slope was low indicating that while teachers used unplanned activities, the length of the typical unplanned activity was very short. Since unplanned activities were so short, they were probably management rather than content type activities. Regression analyses then, supports our conclusion drawn from statistical analyses that teachers' planned time allocations had a positive effect on their actual time allocations.

The scatter plots show that teachers occasionally modified their planned time allocations differently from the theoretical pattern. These modifications show up as deviations from the regression model. Occasionally these deviations were much larger than anticipated. Such large deviations occurred most frequently with unplanned activities. Most deviations from the regression model fell within a narrow range however.

Our findings on deviation from the regression model suggest that the time indicated by the regression model is a good indicator of the average time teachers provided for various activities whether planned or unplanned. Since only six teachers participated in the study, we cannot generalize this conclusion to a larger sample of teachers.

<u>Regression Model for Language Arts</u>

Pearson correlations for four of the six teachers were low. These findings suggest then that the relationship between planned and actual time allocations for Language Arts by most teachers was not very strong.

The results of regression analyses show that the Language Arts time decision pattern for four teachers can best be described by Theoretical Model 6. For these two teachers it appears that their Language Arts planned time allocation had an effect on Language Arts actual time allocations. The Language Arts time decision pattern of one teacher can also be described by Theoretical Model 6 while the time decision pattern of one teacher can best be described by Theoretical Model IX, but the $\hat{\beta}_0$ ninety-five percent confidence interval for their models includes zero. Thus, we cannot be certain that these models describe the Language Arts time decision patterns of these two teachers. We cannot tell then what effect the Language Arts planned time allocations of these teachers had on their Language Arts actual time allocations. But, since the number of cases for these teachers was small, the results must be viewed as inconclusive.

Regression Model for Reading

Pearson correlations were positive for three teachers and negative for three teachers. Two of the positive correlations were high; the other four were low. These findings suggest then that the relationship between planned and actual Reading time allocations of most teachers was not very strong.

The results of regression analyses show that the Reading time decision pattern of three teachers can best be described by Theoretical Model 6. The time decision pattern for two other teachers can also be described by Theoretical Model 6 while the time decision pattern of three teachers can best be described by Theoretical Model IX; but, the $\hat{\beta}_0$ ninety-five percent confidence interval for the regression coefficients of two of these teachers includes zero and the $\hat{\beta}_1$ ninety-five percent confidence interval for the other teacher includes one. Thus, we cannot be certain that these models describe the Reading time decision pattern of these teachers.

The large size of the slope for Teachers 3 and 5 suggests that their actual time allocations for Reading were quite strongly influenced by their planned time allocations to Reading. The small size of the slope for Teachers 1, 2, 4 and 6 suggests that their actual time allocations for Reading were only weakly affected by their planned time allocations to Reading. Since for most teachers the number of cases was small, the results must be viewed as inconclusive.

Regression Model for Math

Pearson correlations for three of the five teachers who taught Math were positive and two of the correlations were negative. Only two of the positive correlations were high, the remainder were low.

In general then, correlational findings suggest that the relationship between planned and actual time allocations for Math by most teachers was not very strong.

The results of regression analyses showed that the time decision pattern for three teachers can best be described by Theoretical Model 6 and by Theoretical Model IX for two teachers.

The slope for Teachers 4 and 5 accurately described their time decision pattern for Math since the ninety-five percent confidence interval for $\hat{\beta}_0$ and $\hat{\beta}_1$ does not include zero and one respectively. The slopes for these teachers suggest that their planned time allocations to Math had little effect on their actual time allocations to Math. The scatter plots however indicate a strong relationship between their planned and actual time allocations to Math.

The $\hat{\beta}_0$ ninety-five confidence interval for Teachers 2, 3 and 6 includes zero; and the $\hat{\beta}_1$ ninety-five percent confidence interval for Teachers 2 and 3 includes one. Therefore, we are not certain whether the regression models for these teachers accurately describe their time decision patterns for Math. The number of cases for each teacher was small, however, so the results must be viewed as inconclusive.

Educational Implications

Practice

The principal finding from this study was that planned time allocations were causally related to actual time allocations (opportunity). Thus, it was concluded that planned time allocations were also related to achievement since time provided or opportunity and achievement are causally related. This linkage between planned time allocations and achievement provides strong support for the notion that teacher planning is an essential teacher practice.

The relationship between planned time allocations and achievement has significant implications for teachers, teacher educators, policymakers and administrators. It would be helpful to consider ways in which this relationship should affect their educational practice.

Teachers. Teachers need to recognize the effect planned time allocations have on achievement. The realization of this relationship should then lead them to make planned time allocations a regular and integral part of their practice. Once teachers make this determination, they ought to commit time and effort to developing and/or refining their planning skills.

Teacher Educators. Teacher educators should assume an active role in helping teachers and policymakers acquire information about the plan/achievement relationship. Specifically, they should explain the causal relationship between planned time allocations and achievement and convince both pre-service and practicing teachers as well as policymakers that planning is essential to effective teaching. Concomitant to the dissemination of information about this relationship should be programs for pre-service as well as practicing teachers that provide instruction and practice in making planned time allocation decisions. Finally, teacher educators should encourage teachers and policymakers to periodically review their planning practices and policies.

Policymakers. Policymakers should review existing policies that deal with teacher planning to determine whether or not the policies recognize the part teacher planning plays in achievement and support teacher planning as an essential teacher practice. Primary goals of this review process should the revision of existing policies and enactment of new policies. The policies should be designed so that they encourage and support teacher planning; describe teacher planning as an essential part of teacher responsibilities; promote opportunities for teachers to plan; mandate the allocation of funds to be used to structure teacher working conditions so that teachers will have planning time; and mandate programs to develop, improve and evaluate teacher planning practices.

Administrators. Administrators must communicate to teachers that planning is an important teacher practice. Toward this end, administrators ought to establish school-wide rules and procedures that encourage teachers to plan regularly. Further, administrators must insure that decisions they make regarding funding, scheduling and staff assignments do not diminish teachers' inclination to plan or interfere with their ability to plan. Administrative conduct of this sort will signal to teachers that administrators place a high priority on teacher planning. Finally, administrators should periodically evaluate teacher planning practices. Results of these evaluations should then be used to develop training programs to upgrade and refine teacher planning skills.

Research

Even though a fairly strong relationship was found between planned and actual time allocations, teachers often departed from their planned time allocations. Since planned time allocations and achievement have been shown to be related, teacher failure to use time as planned is an issue that needs to be investigated. Specific questions relating to this issue which ought to be addressed are: (1) To what extent does the amount of planning time affect planned use of time? (2) To what extent does teacher ability to assess student and curricular needs affect the planned use of time? (3) What effect does unexpected classroom events and/or institutional demands have on planned use of time?

Answers to these questions will give direction to teacher educators, policymakers and administrators as they seek to develop and refine teacher planning skills.

APPENDICES

APPENDIX 3.1

APPENDIX 3.1

IRT
LA Project

May 8, 1978
Robert Hill

OBSERVATION

9:00	Written on the CB:	Purple	Spelling Blue	Pink
		p. 134	p. 147 dictation	p. 119
			p. 146 on your own	p. 120

"Reading to Learn"

selection: Katherine Dunham
pp. 284-289
DM 49-50

Goals: Be ready to discuss pp. 281-288

9:05 1st bell rings. S's begin coming into room. They get out reading and spelling books. T collects $ and notes from home. S's chat with each other socially ($ and notes concern a field trip to Greenfield Village)

9:10 T takes hot lunch and milk count and roll. 2, 10 and 11 absent.

9:12 17 leaves room to take roll and counts to office; 5 tells T his mom can't go on FT. 17 goes directly to reading/spelling class after taking information to the office.

9:13 T—"Ok, on your way." All HR S's except 12, 19, 23 and 26 leave room and go to reading in other rooms.

9:14 S's from other rooms come in. T passes back spelling workbooks. Not all S's are in the room yet. T moves TD#1 closer to front of room. At TD#1 T looks over TE of TB and ditto materials (He is waiting for all S's to get into the room. Reading/spelling does not officially start until 9:15). S's are wandering around room chatting with each other. Some get books out for class.

9:17 T—"All right, your assignment's on the board, get ready to go." Whole class; S's 12, 19, 23 26; S's get out their spelling books, all S's seated now, and find appropriate pages for dictation.

9:18 T—"1st word for Pink." on p. 119. T at his TD#1

Pink-spelling words — Sentence dictated by T.

1. both and 2. soap "...both bars of soap to shower..."
3. roll and 4. gold "...bought a roll and paid a...gold..."
5. road and 6. only "...on the road permit only 2 donkies..."
7. sold and 8. ago "...sold horses 2 years ago..."
9. also and 10. hold "...also hold books..."
11. post and 12. toast "...post notice to toast bread..."

9:26 13. almost and 14. almost dropped roast..
15. clothing "...please wear warm clothing..."

T said words in pairs and then said a sentence that contained both spell words. (11 S's in Pink. No HR S's in Pink)

Blue-spelling words — sentences

1. parties and 2. happier ?
3. happiest and 4. copied "...happiest person because copied..."
5. stories and 6. carving ?
7. companies and 8, prettily "...several companies that do cement work. I have never heard prettily..."
9. empties and 10. marries "...empties bucket of rice when he marries."

9:28 11. merriment and 12. strawberries "...merriment he found strawberries 3 for $1."
13. inventor and 14. position "...Thomas Edison..."

9:30 15. fancier "...her clothes are fancier..."

(T dictated spelling words for Blue in same manner as for Pink; 16 S's in Blue. S's 12, 29, 23, and 26 in Blue)

Purple; S's 19, 23 in Purple; 6 S's in Purple. So they had all 15 Blue words plus 21 Purple words as well as the 2 sentences.

Spelling Words — Sentences

1. nation and 2. student "...From nation of Uganda..foreign S..."
3. guess and 4. movie "...can't guess the name of the movie on tonight..."
5. poem and 6. grocer "...write a poem to the grocer..."
7. proper and 8. o"clock "...proper to read time as 24 past 9 o'clock..."
9. island and 10. hundred "...on island are 100 birds..."
11. together and 12. vacation "...together we go on vacation..."
13. jolliest and 14. hurrying "...jolliest man hurrying on Christmas Eve..."
15. president and 16. electricity "...the President said to conserve electricity..."
17. intellingent and 18. attractive "...that woman is intelligent and attractive..."

9:32 19. remember and 20. advertisement "...remember to put the advertisement..."

9:33 T points out on CB what S's in Pink should be doing. Sentence dictation for S's in Purple — #19, 23; and S's in Blue — #12, 26

9:34 T—"Whose signature is on the envelope?" The helicopter will deliver food to the starving animals in a relief operation."
T says each sentence only once. After S's have had time to write the sentence, he calls on a S to read the sentence s/he has written. Time is provided for any errors to be corrected.

9:39 T ends sentence dictation. S's in Blue and Purple begin working individually on dittos and/or spelling workbook. T begins discussion with S in Pink group. They discuss the
9:45 story from Goals reading book. p. 281-288. As S in Blue and Purple groups complete spelling and dittos,
9:50 they begin to read story on pp. 284-289 of "Reading to Learn" book. S's in Blue and Purple do not go to T during this time (9:39-10:10) for help. They work independently, some seek help from each other.

9:52 T continues discussion with Pink group. S's 12, 19, 23, and 26 continue working independently on spelling and reading assignment.

9:55 T continues discussion with Pink and S's 12, 29, 23 and 26 continue working on spelling/reading assignment. The dittos had been distributed earlier in the week by the T. 23 is working on a different page in spelling book than the others because she is trying to catch up on incomplete assignments.

10:02 19 leaves room to go to BR

10:06 19 returns

10:08 T continues discussion with Pink and S's 12, 19, 23 and 26 continue working on spelling and reading assignment. 23 begins looking at p. 284 in "Reading to Learn."

10:10 T stops discussion with Pink group. They begin working independently. T—"Did you complete ditto #50?" He asks Blue and Purple. T—"Let's take a look at ditto #50." S's get ditto #50 out.

10:11 T stands at TD#1 and finds pp in TE of TB for Katherine Dunham story

10:12 To Blue and Purple groups, T reads outloud from TE of TB. He tells S's to recall that they are studying the: "remembering of events."

10:14 T walks around to check how many S's had completed dittos. T then reads question 1 outloud and asks class what the answer is. T asks S's to use TB, "Reading to Learn," to verify their answers. S's have to look in their TB to find the page and paragraph which supports their answer. They then read it outloud to S in Blue and Purple.

10:16 T reads outloud question 2. (T uses same procedure for questions 2-6 as in question 1 at 10:14)

10:17 T reads outloud questions 3.

10:19 T—"You have to have some reason for making your "yes" "no" selection." Find support for it in the story. Several S's volunteer answers and verification.

10:20 T reads outloud question 4. T—"Confirm and/or verify your answer. Several S's do.

10:23 T—"How many answer "yes" to question 5? How many "no"? T reads outloud question 5; give evidence for your answer. This is not a yes/no question. S's start looking in book.

10:25 T—"Dig out some evidence that the answer is either Chicago or New York." T calls on 23, she reads paragraph from p. 285.

10:29 Class continues to try to find support for answers to question 5 (There appears to be no clear-cut answer to this one). Group settles on Chicago, although the TE of the TB says N.Y.

10:30 T reads outloud question 6. S's in Pink group begin to leave room and T calls them back because he had not dismissed the whole class (T was concerned that members of the Pink group were wasting time). He said they had lots of work to do and wasting a little time each day added up to a lot of wasted time over the year.

10:31 T dismisses reading/spelling class. (Transition) T putters around the room. S's leave and HR S's come into room. They sit or stand around waiting for recess to begin.

10:34 T dismisses S's for recess.

11:00 S's begin coming in from recess.

11:01 T—"Metrics, p. 38." Only about 1/2 of S's are in the room yet. T leaves room to round up the rest of the HR S's. S's in the room begin getting out their books (metric) and some begin working.

11:02 S's continue to come into room; 9, 12 come in

11:04 T returns, 16 and 24 come in

11:05 T—"Today, in fact this week we want to wrap up our metric unit." He goes to the CB and begins drawing a chart, whole class. T writes on the CB; as he writes he asks the class to tell him what to add to the chart. For instance, T—"What are the prefixes for greater than the unit?" S'S—deca, hecta, etc.

VALUE	1000	100	10		.1 1/10	.01 1/100	.001 1/1000
	Kilo	Hecta	Deca	Unit	Deci	Centi	Milli
				Meter			
				Liter			
				Gram			

11:07 T—"Hope you will have a good grasp of the prefixes used in linear, volume, mass."

11:10 T—"Write all the terminology to complete this chart. S's write this chart on a blank sheet of paper. S's begin drawing their graph. T walks around and monitors S's work.

11:13 T—"Remember what the symbol $\approx$ is for: "is about"
T writes on CB "1 meter $\approx$ 1 yard. 1 liter $\approx$ 1 quart
1000 grams (1 Kg) $\approx$ 2 lbs"

11:20 T sets out balance on a desk. He says he won't use it today, but will by Thursday. T tells whole class to continue in the workbook after completing the chart.

11:21 T points out the on the CB and tells the class to note that the metic system is close to the system we are accustomed to.

11:22 Discussion on how the price of food is going up. One S talked about buying firecrackers (FC).

11:25 12 told of putting FC on an old lady's porch. T then lectured the class on respecting the rights of others; asking permission to go on others property; harassing neighbors.

11:29 5 leaves for safeties.

11:30 T tells class to turn to p. 39. T reads outloud to the class from this page.

11:32 T asks what 500 grams would be called. Several S's respond erroneously. Finally T helps them arrive at 1/2 kg.

11:34 T—"Will continue on p. 40 tomorrow."
T tells class to line up to go to lunch.

11:35 T dismisses class to go to lunch.

12:10 1st bell rings. S's begin to come into room. They take out books and magazines and get ready for USSR. 19 helping Kindergarten T. 8 helping Kindergarten T. They are not in the room yet.

12:15 All S's in room except 12, 16, 5, 7, 8, 9, 19, 20, 26.
All in the room are reading for USSR. 2, 10, 11 are absent.
T sits at TD#2 and fills out safety patrol permission forms.

12:17 5 comes in and starts reading.

12:18 26 comes in and starts reading. T leaves room.

12:19 T returns. 9, 10 come in pushing the Data Bank book cart.
T talks with 18 at S desk (20 sec.)

12:20 T leaves room.

12:22 T returns and continues work on SP forms.

12:25 USSR continues, whole class.

12:30 T—"All right, it's time to get ready for science."
S's get out science materials and leave room to go to science class in another room. Transition, T walks around and puts Data Bank books on S's desks. 7, 8, 12, 16, 19 had not come in yet from lunch. They were either safeties or were helping in K or kitchen. These S's went directly to science whenever they finished their chores.

12:31 T passes back dittos to S's from other room as they come into his room.

12:32 Not all S's yet in the room. Those in the room begin working on ditto.

12:34 T—"You might want to refresh your memory by looking at p. 216 and the following pp. which talks about the Emancipation Proclamation (EP)"

12:36 S's begin working independently on the set of dittos. The dittos are p. 22-24 of Unit 8-Inquiring About American History c. 1978 Holt, Rinehart and Winston, Inc. (Data Bank Series)

12:40 T walks around room monitoring S's work.

12:42 T—"Some of you are having trouble on the second page (23)." T asks for the reasons they have given for question 1.

12:44 T asks for reasons for question 2.

12:46 T asks for reasons for question 3.

12:50 T gives reasons why Lincoln had chosen this time to issue the EP. S's had trouble coming up with reasonable answer for this question. T points them to p. 216, 217 of the Data Bank TB.

12:53 T asks for reasons for question 4.

12:54 T asks for reasons for question 5.

12:56 Another T comes into room and talks with T in room for about 1 minute.

12:59 T—"Turn to p. 3 (of ditto, p. 24); T reads outloud the statement at top of page. He asks for S's responses.

1:00 T point S's to p. 218 in TB.

1:02 T reads outloud part E. on p. 24 of dittos.

1:03 S's begin working on dittos. T tells class the dittos are due tomorrow (5/9/78).

1:05 T asks for additional reasons for Part D on p. 24 of ditto.

1:06 Class is dismissed and S's leave. Almost immediately, HR S's begin coming into room. Transition.

1:08 All S's in room except 2, 10, 11—absent. T tells S's to work on dittos and they can find help in TB on pp. 216-220. 15 leaves room to go to principal's office. Whole class.

1:09 S's begin to work independently on dittos. T walks around and monitors S's work.

1:10 24 leaves room for BR.

1:11 12 leaves room for BR.

1:13 24 returns

1:14 15 returns.

1:15 T begins discussing questions on p. 23 of ditto. He asks for S's responses. 15, 14, 7, 12, 20 respond to question 1—because people should be free; then T reads outloud question 2. 26-no, it will destroy my business; 6-yes; 19-yes/no, no reason 12-yes; 21-yes/no, South couldn't agree; 20-? war go on longer He tells S's they also have to state a reason for giving the answer.

1:16 12 returns
1:20 T reads to class outloud question 3. He then asks for S's responses; T calls on the following S's: 3—did not respond 6—waiting for good wind—afraid of Congress veto

1:21 16—No, most people wouldn't hear (lack of communication)
26—Yes, more slaves would be made
19—Yes, the sooner the better
1:23 6—Japanese were in Washington D.C. on Pearl Harbor Day

1:24 4—goes to BR

1:25 T asks 22 to read outloud question 4. He calls on for answer: 22—free slaves, 7—war will end.
1:26 12—no slaves and war will end, 5 leaves to go to BR, returns at 1:27; 4 returns

1:27 T asks 22 to read outloud question 5. He calls on following S to answer: 9—?
1:28 23—South will be mad and not like Lincoln; 3—no response 26—war will still go on

1:29 T—"There were 4 million slaves. What will happen when all these people walk away from plantation and owners?" 12—many would be shot.

1:30 21—no place to go. No one would want them.
T—"All of a sudden 4 million are free to go where they want to and do what they want to, what will happen? 5—North not strong enough to enforce

1:31 16—owners would not let blacks work.
T—"You mean racial prejudice when blacks went to find a job?
16—Yes, wouldn't sell land to blacks
T—"Think back to story of Amos Fortune." 20—race riots, 24—riots in 1967, my dad was in it. He's a state policeman.

1:33 T—"I was in Virginia in 1967 and saw the fires in Washington, D.C. These are some of the far reaching effects of the EP."

1:35 T—"Take a look at p. 24 of ditto." T reads outloud the first section. What are we supposed to do here, 4 is called on. No response.

1:36 T—"I'll give you until tomorrow to do this. I want to finish section E. 13 reads it outloud. T—Put down at least 3 statements about what the President does. 19—eat, sleep and drink. T—NO! (I crack up, almost all of class miss it.)

1:37 T—You must have heard on the radio or T.V. about what your President does. Put them down on your paper. S's write down their ideas. T monitors their work. Whole class, S's work independently.

1:40 T—What do you have down? 23—making laws, save energy, stop pollution; 21—control laws...? 16—keep states in order, keep peace...? 12—we already have peace. T—wait a minute, why do we have the U.N.? Response...? 16—Israel, Arabs...?

1:41 17 leaves room for BR; 19 leaves room for BR; 6—make laws. T—He signs laws; 5—keeping taxes for government. T—He makes suggestions to the legislature. A dictator would do it alone.

1:43 24 leaves room for BR. 9 returns

1:44 T—How about holding press conferences? How about planning budget with advisors? T—How about commander-in-chief? 17 returns.

1:45 16—cracking peanuts. On this note, class ends. T asks S's to pass book to the front of room. 10 leaves room for BR.

1:46 T—"All right, let's turn our efforts to English." 17 leaves room for ? Whole class.

1:47 24 returns; T asks S's to tell riddles they either know or made up—6, 12, 3 respond.

1:48 T—"The riddles you should have made should have been descriptive." He gave several examples. Who has black hair, green pants etc. S's guess the person thus described.

1:50 18, 23, 19, 14 give examples of riddles.

1:53 T—Last week we talked about adjectives. If I put DOG on CB, it would be pretty general; if I put BIG DOG that would eliminate all the small dogs. 10 returns. This is in preparation for writing a descriptive advertisement.

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1:55 T—p. 192 in English book. T reads introduction outloud.

1:56 T allows a moment for S's to read advertisement silently. T asks 15 to answer question that begins, "Where does..." No response. 16—at the beginning. T reads question outloud that begins, "In describing the phonograph... 12—I don't know; 20—performance features.

1:59 T—what other details? 23—perfectly balanced arm; 9—brand new. T—age is important. What else? 21—how much it cost; 23—phone #; 9—for sale; 7—no scratch. T reads sentence that begins, "Is the description complete?" He reads outloud.

2:03 14 leaves for BR; T reads sentence that begins, "What impression..." outloud. 14—It's good and worth it; 7—the same; 15 reads A. for discussion outloud.

2:04 14 returns; 13 reads B. outloud. T asks S's to respond: 24—all the details; T—Why did he include the details he did? 5—ones a buyer would want to know; 18—?

2:06 T reads A under activities outloud.

2:07 24 leaves room; T passes out paper. T asks S's to write an advertisement to sell a bicycle. Limit of 30-35 words. Everyone will write a bike adv. Then I'll have you write one on anything you want to. This way if everyone writes on the same thing, we'll get ideas from one another on what are important details.

2:08 24 returns.

2:09 S's begin writing; T wrote CONDITION on the CB. Someone wanted to know how to spell it.

2:10 T—24 reminded me that an ad in the S. Journal costs $ for every word. Therefore you want to say it in as few words as possible and still interest someone in the advertised item.

2:11 T leaves room.

2:12 T returns and walks around monitoring S's work; whole class.

2:13 T wrote SCRAMBLER on the CB; T read over 19's ad, then 4, 21 (T was walking around the room and would stop and read S's advertisement.)

2:15 Then 20, 18.

2:16 T asks 19 to read her ad outloud to the class. He asks class to notice what would cause you to be interested in the article.

2:16 She had the color of the article given in her advertisement.

2:18 T—Is it important to put the color? S's—yes. 6 reads his ad outloud to class. 20 reads his ad outloud to class. T—What could have been eliminated? How about the word nice?

2:19 18 reads ad outloud to class. T—Could you have put it in 1 sentence instead of 3? 16 reads ad outloud to class.

2:21 24 reads ad outloud to class; 9 reads ad outloud to class.

2:22 12 reads ad outloud to class; 3 reads ad outloud to class.

2:23 7 reads ad outloud to class. T—I have a feeling we could take out words. There's a show on T.V. called "To Say the Least." This is a game we could play. Tonight, cut out 2 ads from papers and bring them in tomorrow. 17 returns. Maybe we could play the game tomorrow.

2:25 T—Eliminate more words from your ads. Transition.

2:26 T—We're going to continue on our safety unit. (whole class) Stand up and shake out some stiffness; 3, 18, 23 leave room for BR. T—turn to p. 216 in your Health TB. S's begin getting out their books. Some still shaking out stiffness.

2:28 23 returns; 3 returns; 25 leaves room.

2:30 26 reads outloud 1st paragraph on p. 216.

2:31 18 returns
T—last year we had operation Irene, to simulate how you would vacate your house. T asks S's to tell about how to get out of their house in the event of a fire; whole class.
5 responds how to get out of their house in event of fire.
24 responds how to get out of their house in event of fire.

2:32 25 returns.

2:33 12 responds how to get out of their house in event of fire.
7 responds how to get out of their house in event of a fire.

2:34 T—If you have to break a window use a pillow, shoe or blanket so you won't cut yourself. 6 tells out to get out of...

2:35 7 tells how to get out of...; 15 tells how to get out of...
18 tells how to get out of...
T—safety windows on trailers, different from years ago.

2:38 16 tells how to get out...
20 tells how to get out...
18—water heater blow up, I would be a goner

2:40 24 tells how to get out...
20—don't sleep well, a light sleeper, I'd wake up
16 tells how to get out...

2:43 T—"What is just as dangerous to your life...?
T—"How might you help to avoid home fires?" question from p. 216 of Health and Growth.
26, 12, 20, 6 respond to T question.

2:44 10 begins watering plants. She has a watering can and walks around the room to the plants.

2:45 T asks 21 to read "Learn How to Escape Fires..." on p. 216 outloud.

2:47 T asks class how to keep smoke from going up the stairs in his house after he described the layout of his house.
23—smoke detector
6—patch the cracks in the wall, S#2—board up the stairs

2:48 17 leaves room

2:49 22 smoke detectors go off when we open the broiler.
T—Is it heat or smoke sensitive?
18—we have one heat and smoke sensitive—both.
20—my grandpa hit his because it kept going off. Man he put his fist right through it. 14—?

2:53 T asks 22 to read "A Fire in a High Rise Apartment" on p. 217 outloud.

2:54 17 returns.

2:55 T—What does it mean "test the door"? 19—see if it's hot; 6—no electricity in our trailer in Florida. When we went there in Dec. we had to live practically in the dark.

2:58 6 reads outloud last paragraph on p. 217 to whole class.

2:59 23, 25, 22 leave room for safety patrol. 6 stops reading. Discussion follows.

3:00 20 cattle starving in Texas eat cactus, they burn off sharp spines. I saw it on T.V. 6 resumes reading outloud.

3:02 10 stops watering plants.

3:04 6 stops reading.
T—paramedics go out with every fire call in Dimondale; 5—my window in my BR is small; 20—put in fire sprinklers in Meijers new add on Penn. A worker hit a fire alarm and about 6 fire trucks came.

3:06 T—You can notice the sprinklers in Meijers. They will come on in the event of heat. 20—they got about 20 steering wheel like things so the fire trucks can get water at Meijers.

3:08 T—There are probably different kinds of sprinklers in big department stores. 20—they should put foam in the ceilings so when the fire got so high the foam would drop and put out the fire.

3:09 T asks 9 to read outloud p. 219 at the top of the page.

3:10 7 leaves for safeties. T leaves room.

3:11 T returns.

3:12 T—reads outloud the common causes of home fires. T—We'll continue tomorrow on bicycle safety. S's begin getting ready to go home.

3:15 T stops reading, tells class to get ready to go home.

3:20 S's leave to go home.

APPENDIX 3.2

ORIGINAL TEACHER PLANS

APPENDIX 3.2

LESSON PLANS FOR THE WEEK BEGINNING March 20

20 MONDAY	Team Meeting	9:15 - 10:10 Career Breakfast: 1st/report on what they're going to do in comm. Centerpieces((me) Clean up (me) Host/Hostess (speeches) (me)	10:10 - 11:10 Math 5/L.A. 4	11:10 - 12:00 Math 4/L.A. 4	12:00 Lunch
21 TUESDAY	Team Meeting	9:10 - 10:10 Gym & Music Check w/Maxine to have kids sing It's A Small World	10:15 - 11:00 Oops/water all over: Redo L.A. characters whole team →	11:00 - 12:00	Lunch
22 WEDNESDAY	Team Meeting	9:15 - 10:10 Career Breakfast: Make placemats When finish w/comm. do international people *See about getting video tape	10:10 - 11:00 Math 5/L.A. 4	11:00 - 12:00 Math 4/L.A. 5	Lunch
23 THURSDAY	Team Meeting	9:10 - 10:10 Gym & Music	10:15 - 11:10 Math 4/L.A. 5 (visitor coming in)	11:10 - 12:00 Math 5/ L.A. 4	Lunch
24 FRIDAY	Team Meeting	9:00 - 10:30 Career Breakfast: *Sing It's A Small World Menu - Fruit Freeze *VideoTape (?) International Theme	Special Guests: observers (?) Bus Driver/ Police: Spec. Services/ Fisheries Biologist Deputy Sheriff/Soc. Work Breakfast Clean Up:	Independent work: Math: week's goal Country Reports: Metric Folders: Critical Reading *Special Easter Containers	Lunch

Sharing	1:00 - 1:40 Science: Competency Measure Module #77	1:40 - 2:20 Social Studies: Map Mystery Lesson #6 Tape & Response Book	2:20 Break - Mary Ann	USSR w/ oral reading: Book: Queenie Peavy by Robert Burch	3:05 Calendar	3:10 Clean-up	3:18 Dismiss
	1:00 - 1:30 Science movie —Experimenting	1:40 - 2:20 Career Breakfast	Break - M.A.	USSR w/ oral reading	Calendar	Clean-up	Dismiss
Sharing	1:10 - 1:40 Research Comm. give reports about career - w/ V. aids Social Studies	1:40 - 2:20	Break - M.A.	USSR w/ oral reading	Calendar	Clean-up	Dismiss
	1:10 - 1:45 Country Reports total team	1:45 - 2:20 Set up tables for breakfast: tables Kids in library Critical Reading? Country folders	Break M.A.	Breakfast practice/ Introductory speeches Song Serving	Calendar	Clean-up	Dismiss
Sharing	1:00 - 1:40 Math 5/L.A. 4	1:40 - 2:20 Math 4/L.A. 5	Break M.A.	USSR w/ oral reading	Calendar	Clean-up	Dismiss

APPENDIX 3.3

APPENDIX 3.3

PROCEDURES FOR OBSERVATIONS

1. In recording your observations, use quotation marks for direct quotes by the teacher. You should at all times try to record what the teacher says as closely as is possible. However, when this is not possible, just record what the teacher says as closely as possible. When you merely summarize the teacher's comments, you do not need to place quotes around the words. However, in many instances, the comments of the teacher are worthwhile to record directly and if this is the case, use quotation marks so we know this is exactly or precisely what the teacher said during the lesson.

2. Use the word "teacher" to capital "T" to refer to the teacher during your recording of the observation of the teacher. Do not use the teacher's name as this can be confusing.

3. When the teacher is doing something with a subgrouping of the total students or with individual students, at the point at which this activity begins record what the children who are not directly involved with the teacher are doing. Any time the teacher changes activity from one group of children to another, be sure again to record what all groups or sets of individuals are doing.

4. When you record that a given teacher has the children or a child read, indicate whether the reading is out loud or silently.

5. In order to establish a continuity of activities in the classroom, when you are recording the activities of the teacher or an individual student or a group, make sure to indicate at what point they are finished with a certain activity and at what point they begin the next activity. Perhaps a simple expression for this is, student (group or teacher), C finishes X and starts Y. In this sentence X is the content or activity just completed and Y is the activity or content just beginning.

6. Individual level students - record this when their <u>allocated</u> time to an activity is different from that of the rest of the class or from the subgroup to which they belong. <u>Don't</u> worry about <u>engaged</u> time.

   a) <u>Always</u> record when they are <u>individually interacting with a teacher</u> or an aide unless interaction is momentary

   b) Record when child leaves room for library, toilet, etc.

   c) If they are all working on seat work, simply record class working on seat work

d) If child is punished by being made to stand in corner or leave room - record times

e) If all children or a subgroup are doing worksheets but one child is doing something entirely different - record it

f) If individuals are working on worksheets or center work and the activity changes or they go to a different center or change what they are working on (from math to phonics) try to record this for individuals if possible. If you can't do it, don't worry about it.

g) Record kids who very noticeably and obviously deviate in their behavior from what they should be doing

h) If oral reading - note pupil doing it

7. Always record what the teacher and the aides are doing and with whom they are doing it.

8. Don't worry about what is or isn't integration. Simply record the series of questions or comments the teacher makes during the lesson along with the times at which they occur. Don't worry if you miss some of the comments or questions. Simply try to record as many as you can. This need only be done when the teacher is giving instruction for the whole group or various subgroups. You do not need to record comments or questions used to give directions or in instructional interactions with individual students.

9. While doing observations, keep a separate sheet to record questions that occur to you during the day to ask the teacher at the end of the day.

10. Remember to always record what the teacher is doing. This means that if there is any question about which kids to observe, that is, you can't watch all of them, note what the kids that are interacting with the teacher are doing, rather than the kids that are not interacting with the teacher.

11. It seems useful to obtain copies of the books that the kids are using during the lesson so you can follow it while they are working on the lesson. You might simply ask the teacher if there is a spare copy of the reading book or the math or whatever and that way you can follow along.

12. For movies, records, slides, and film strips, be sure to summarize the inferred purpose in the content when they are used in the classroom that you are observing.

13. For those people who have half-day observations, be sure that both of you are using the same numbering system for children from one half-day to the other. It probably would be simplest for the morning observer to pass along the numbering system he/she uses to the person that is involved in the afternoon session.

14. Make sure you get the names of the children and the corresponding number you used for them during the observation every time you observe, so that the numbering system from week-to-week is comparable. It would be nice, but not necessary, to have the same numberings from week-to-week for those obervations you do in the same classroom. If you are not able to do this, then you must attach the numbers with their names to the list so that comparability can be achieved from each week's observation to the next. <u>This is absolutely critical and must be done</u>.

15. After you have completed your observation, check your recording of that observation over very carefully. Re-read the entire description asking yourself the question, "Will the reader of this know what every student was doing during the entire course of the observation?" This of course means what the student was supposed to be doing since we are not concerned with what he is actually doing in terms of fooling around or things of that sort. But one should be able to determine from the observations what each student was doing or supposed to be doing during the course of the observation. Also what the teacher was doing should be discernible from the observations. If you find your description to be incomplete on some of these counts, fill in supplementary or clarifying material and then turn in the observation to be typed.

APPENDIX 3.4

APPENDIX 3.4

Coding Procedures

General Procedures

1. Each student in each class is assigned a number (01, 10, 20) which remains constant for all conding procedures.

2. Class refers to a number assigned to each teacher in the study.

3. Day refers to the date of the data source which is coded.

4. Source indicates whether observations or teachers' plans were used as the data source.

5. Beginning and ending times refer to the time activities started and stopped.

6. Content Areas include types of activities found in school days with provisions for major and minor areas.

7. Group refers to whole group, subgroup or individual.

8. Group Size refers to the number of students in the group considered; check attendance to determine group size.

9. Supervisory Code refers to teacher supervised, other supervised or nonsupervised.

10. Location refers to in own room, out of own room, or out of school.

11. Process variable refers to the amount of actual reading or writing done by students during a time interval. Writing refers to text or sentence compositions, not to penmanship.

Student Procedures

12. Use the same subject numbers throughout all of the coding for a given classroom. That is to say, subject 25 must refer to the same person in all of the coding.

13. If a child is absent record on the code sheets his number, class, day, and source. For the beginning time, give the beginning time for all other students for that day and for the ending time, use the ending time for that day. Be sure to check attendance and note those children that are absent on the code sheets.

14. If some pupils are not identified, ignore their actions in the coding or if they are identified but only as involved in momentary actions, ignore them in coding (anything 30 seconds or less or "brief" is defined as momentary).

15. If a beginning and an ending time cannot be found for children leaving the room, ignore their having left, i.e., treat them as if they never left the room.

Time Interval Procedures

16. Times for intervals must be continuous, e.g., 9:12 - 9:20; next interval 9:20 - 9:40; next 9:40 - .

Content Areas Procedures - General

17. Always consider the large unit when classifying content areas. If a larger segment of time which is homogenous with respect to content has embedded in it only a short comment by the teacher which would change the content specification, ignore this comment and code for the larger unit.

18. When the teacher gives directions or elaborates on an assignment, this should be coded in whatever content area it occurs; it is part of the time interval for the content area coded.

19. Announcement of due dates should never be coded separately.

    a. If due dates are announced during a regular lesson, then treat the announcement as part of the content area in which it occurs.

    b. If due dates are announced during a transition, consider the announcement as part of the transition.

20. For the codes 0100, 0200 and 1500, no minor is usually coded.

21. When children leave for the library, code the content of what they will be doing in the library if you know it. If children leave during a period in which they were instructed to use the library as a resource, then code their content area as the same as what the rest of the class is studying during that time interval: only code them being out of their room by location code. If children leave during some other time when the content is not clear, or during the reading or language arts period, or during their free time, assume they have gone to pick out a library book for their free reading time; code these students as 0212 and 12 on the process variable.

22. There is no separate code for tests. All testing should simply be coded as to the content area which it covers. For the supervisory code, code it as 1 - teacher supervised. For the group designation code, code it as individual. For the process variable code - code it as 30.

23. Code movies or tests or field trips or educational assemblies in terms of the content involved.

Content Areas Procedures — Language Arts

24. Code all sharing activities as 0110: Language Arts - oral communication. If children spend time with speech and/or hearing therapy, code them as 0110.

25. Writing instruction under language arts includes instruction in the process and art of writing as well as structured practice in writing; it does not refer to penmanship.

26. Sentence composition refers to composing sentences only - not to text composition. Sentence completion is sentence composition if it involves more than one word.

27. If as a part of the language arts lesson, children are taught to read maps, tables, or graphs, or to develop map legends, tables or graphs, this should be classified as 0180 - information gathering skills.

28. The category "literary forms" under language arts is for content dealing with various literary forms such as poetry, autobiographies, biographies, fairy tales, folktales, and tall tales. If the reading lesson aims at reading literary forms then "literary forms" should be used as the minor designation.

Content Areas Procedures - Language Arts and Reading

29. For reading and language arts, use the teacher's specification (from the schedule or the blackboard or convention) as to whether the major code is reading or language arts.

30. For all reading and language arts lessons where the major specification is Reading or Language Arts, code the content of the reading, writing, spelling, etc. lesson as the minor content specification. If the content does not fit one of the codes, such as science, social studies, etc., then and only then leave the minor code blank. Do not stretch the point in coding the minor area. In a fairly straight forward way, it must be science, social studies, etc. before it is recorded as such.

    a) Reading lessons can have a minor in language arts, and vice versa.

Content Area Procedure - Reading

31. The reading categories are defined as follows:

    a) No explicit analysis - no overt attempt is made at analyzing what is read.

    b) Word analysis - includes phonetic analysis, structural analysis and sight words.

    c) Word meaning - vocabulary development.

d) Text analysis - comprehension, sequency, main events, main idea, setting, etc.

e) Individual reading - child is reading by himself either silently or to the teacher.

f) Group reading - the activity where a subgroup meets with the teacher and some or all of the children alternate in reading the text and sometimes answer questions about what they have read. Also, where questions are asked and the children then read silently to find the answers. To be coded here, children must be reading. If the children are reading paragraphs from their workbooks in class with the teacher and then discussing them, code this as group reading.

g) Lecture or discussion - where the teacher lectures on or the teachers and students have a discussion about reading itself. Also, for situations where there is a discussion about the content of what has been read but there is no reading (either silently or out loud) - during that lesson. Also, when the teacher lectures (talks) about reading, word analysis, or literary forms without actual reading by the students.

h) Individual reading and doing exercises - where the child reads by himself/herself and does exercises based on the reading.

i) Doing exercises (dittos, tapes) - where children are doing only the exercises. If the teacher is discussing their answers with them, this is coded as discussion. If an individual child reads with T and they discuss the text, this is coded as individual reading with T's supervision: don't code as discussion.

32. If more than one of the reading levels (on the third digit, e.g. word analysis, etc.) occurs during a lesson, code as follows:

a) If the different areas are covered separately and are sequenced one after another and are of at least 2 minutes in duration, code the different parts separately. Create a new time interval for each part of the lesson.

b) If the different levels are distinct and sequenced but short in duration, (all but one less than 2 minutes), code the whole lesson as one time interval and code it hierarchically, giving the level with the highest code the greatest priority (e.g., if both word analysis and text analysis occur and word analysis is less than 2 minutes in length, code the whole interval as text analysis).

c) If the different levels are intermixed in the lesson, code the whole lesson as one interval and use the level with the highest code.

33. If a child is reading with an aide, classify the content area as 0200 and code the process variable as 12.

34. If a child is doing a crossword puzzle and it is not clear from the context that the purpose of it is for word analysis, then code 3 in the third digit for reading, or word meaning.

35. In reading on the 4th digit (individual reading, group reading, etc.) make a new interval for activity change and code it separately. Do not code the whole lesson or use the notion of an hierarchy.

36. When dealing with reading groups, code the children involved in that reading group 0900 from the moment the teacher calls them up for the reading group until the point at which the actual instruction begins. When the children finish with the reading group and are dismissed, code them 0900 from that point until the point at which it is recognized that they have actually begun work on some other matter. If this is not indicated, then do not code them as having returned to seatwork or whatever else it is that they are doing. This latter case will most likely be prevalent.

Content Area Procedures - Social Studies and Science

37. The distinction between social studies and science revolves around the focus of content. If the focus is technical, then it is science. If on the other hand, the focus is on the effect that some scientific or technological field has on society or individuals, then it is coded as social studies.

38. If during a science or social studies lesson the teacher instructs the students in reading or some area of language arts, be sure to code reading or language arts as the appropriate minor. To be coded as a minor instead of as a process (see convention 60), there must be formal instruction or formal feedback in the area.

39. Social studies includes history, geography, sociology, anthropology, government, political science and economics (all coded as 0800). Lessons dealing with social behavior and affective goals and values should be coded as social studies (0810).

40. In terms of the code 0810 (content area), only code lessons where there is formal instruction in the area of values or social attitudes. Do not code momentary interactions about values, behavior in the classroom or issues of discipline under the code 0810.

41. "Child of the week" is coded 0810.

Content Area Procedures - Breaks, Beginnings, and Endings

42. Codes 09 - 13 for Content Areas indicate various breaks.

    a) 09 - for between instructional activities including the passing out or collecting of materials. If a child spends time with a social worker, code him as 0900.

b) 10 - only for recess or lunch.

c) 11 - all activities at beginning or ending of day (or half of the day) including lunch money, roll, clean-up.

d) 12 - if children disappear for short periods of time from their classroom and it is not clear where they went, code them as 1200.

e) 13 - any other break such as fire or tornado drills; other people enter the room, etc.

f) If children come in late at the beginning of the day, code them as 0900 until they arrive; if they come in late after lunch, code them as 1000 until they arrive.

43. Whatever happens at the beginning of the day or at the beginning of the second half of the day (before the teacher formally begins the activites) is coded 0900 or transition. When the teacher begins, this could be coded as 1100 if it is a beginning or ending exercise or as the regular subject matter if there are no beginning exercises.

44. For transitions or breaks, do not code process variable, group, supervisory code location, etc. Just code times and break code.

45. Children leaving and returning during transitions or breaks or opening exercises need not be separately recorded, as long as they leave and return during the break.

46. For transitions to and from reading subgroups, code them for the children involved when the information is available. For the beginning of the group lesson, code the transition from the time the teacher announces the group to the class to the time at which the lesson begins with these children. If there is confusion as to the beginning time vs the transition, code the lesson as having begun immediately. The end of the sugroup comes when the teacher announces they are finished. If there is no further reference to these children returning to their seats or beginning other activities, code without transition.

47. Make a judgment about when the transition is over using the criterion of when most children have begun to work.

48. Code all passing out of materials as transitions.

Content Area Procedures - Seatwork

49. If the child is doing seatwork during the reading lesson and is reading in his reader, and it is not clear to the rater whether the reading instruction is aimed at word meaning, text comprehension, or whatever, classify subject as 0202. The third digit 0 means that it could not be ascertained what the nature of the reading task is, but it is known that the child is working in

reading and he is also doing reading by himself. Likewise, if the child is working on some ditto or a workbook and if it cannot be ascertained from the observation what the exact nature of the exercise is, classify as 0203. This indicates he is reading and working on exercises, without knowledge of the exact nature of the material. If you know whether it is word meaning or text analysis or whatever, then, of course, code this in the third digit. If the child is intermixing the two, that is, reading and also doing exercises and it is not possible from the observations to know at what point the child stopped reading and began doing the exercises based on that reading, then use the code 6 in the fourth digit for reading. This indicates both reading and exercises are being done during that period.

50. If during an individual work period the teacher makes an announcement about the fact that the children ought to move on to task B when finished with task A, the fact that both A and B are now possible tasks must be accounted for. This will usually necessitate the use of mixed seatwork code 15 with the third digit indicating, if it is possible, which two subject maters are being included in the mixed seatwork. However, if the teacher does not change subject matters by her announcement; that is, both assignments are in reading, or both assignments are in language arts, then there is no need to move to the 1500 code.

Group Designation Procedures

51. Group designation refers to the nature of the instructional setting.

52. a) For group designation, if more than one child is involved, but less than the whole class, code as subgroup.

    b) Movies and assemblies are whole group activities unless otherwise specified.

53. Code the group size variable for all intervals but do not change it to reflect momentary changes in group size such as toilet, library, etc. breaks for individual children in the group.

    a) For group size involving standard groups, just take the given number in the group minus those children that are absent for that day.

    b) For all nonstandard groups, count the number involved.

Supervisory Code Procedures

54. For the supervisory code, it should be coded teacher or other supervised only if the teacher or aide is actively involved in educational supervision or monitoring of student activities.

    a) If a teacher is walking around the room and supervising seatwork by interacting with the children and all the interactions momentary, code all chidren during this period as having been supervised.

b) If the teacher is at his/her desk or is walking around and has a 30 second or longer interaction with a child, code the child as having been supervised during this interval and all other children during this interval as not having been supervised.

c) If the teacher is at his/her desk or a table working on something by him/herself or watching the children, and children come up to the teacher for momentary interactions, code all children during this interval as non-supervised.

d) All whole group or subgroup teacher instruction is coded teacher supervised for the children involved.

e) Code the showing of movies, instructional use of tapes, records, etc. typically as supervised.

55. Only use the category "other supervised" when it is some individual other than the teacher, such as an aide or another student who is used as an aide in the classroom. If the children leave the room and receive their instruction from the music teacher, the P.E. teacher, or the art teacher, code them as having been teacher supervised. Also code children during the time they are in the library as teacher supervised (unless there is no person formally assigned as a librarian).

56. If a child is near the teacher, working by him/herself and the teacher is also working by him/herself, the supervisory code is 3 - nonsupervised: close physical proximity to the teacher does not count as supervision.

57. If during an observation a child is recorded as having come up to the teacher for instruction and the next instance recorded is of a new child being called up to the front, at that point (unless otherwise specified in the observation), code the other child as having returned to his seat. Most observations should indicate both the time they came up and the time they returned to their seat, but if not, use the above convention.

58. Do not forget that when the supervisory code changes, i.e., the teacher starts or stops to actively monitor, a separate time interval has to be coded.

59. Ignore any individual discipline problems in the classroom, no matter the length of time involved, unless they interrupt the teacher while he/she is with some other children who are receiving instruction. The point is that the interaction must take teacher time or supervision away from other children.

Process Variable Procedures

60. For the process variable, code whether during the time interval in question the student him/herself did any writing or reading. The student must have actually done the reading or writing. If both occur, code it 4.

    The process variable records the act of reading or creative writing, not formal instruction in reading or writing, which is recorded as a major or minor. The second digit records roughly what proportion of the interval was spent in reading or writing. Reading must involve more than reading directions or sentences on a ditto - it must involve the reading of text. Writing is also classified only when the child writes text - not merely filling in words on dittos or copying material from the board. In those instances where the child makes up a story but does not write it him/herself, this is not classified as writing. To be classified as writing, more than a sentence must be involved. If instruction in writing is provided but the children do not actually write themselves, code the major as 0170 and the process variable as 30.

61. For the process variable, if the children leave the room to go to a reading class with another teacher, code them 12.

62. For the process variable, code children working in their workbooks as 30.

63. If there is no information about the process variable (reading and/or writing) which can be broken down to the individual level for time intervals, code the process variable 00.

64. For USSR, code 12 for the process variable (after transition, if applicable); USSR represents a structured opportunity to read.

Numbers Used for Coding Observations and Plans

Teachers were assigned a number.

Teacher: 1, 2, 3, 4, 5, 6, 7

Day - 3 digit code; example 323 = 3/23/78, 601 = 6/01/78

Source -

2. Plans
3. Observation

Times - 5 digits; example 12345 - 12:53 1/2
10370 = 10:37
01530 = 2:53

Content Areas

01. Language Arts
02. Reading
03. Arts, crafts
04. Physical education
05. Mathematics
06. Music
07. Science
08. Social Studies
09. Transitions from one instructional activity to the next/managerial
10. Ordinary breaks (lunch and recess)
11. Beginning and ending exercises (weekly or daily)
12. Toilet
13. Other brakes (fire, tornado drills, people enter room)
14. Social activities (e.g. parties)
15. Mixed Seatwork
    0. Unclassifiable
    1. Reading and Language Arts
    2. Reading and Math
    3. Reading and one other
    4. Language Arts and Math
    5. Language Arts and one other
    6. Math and one other
    7. Three or more areas

Language Arts (01)

0. Unclassifiable
1. Oral communication
2. Penmanship
3. Spelling
4. Punctuation
5. Grammar/usage
6. Sentence composition
7. Writing Instruction
    0. Unclassifiable
    1. Expository (factual or nonfiction)
    2. Letter
    3. Fiction (poems, stories)
    4. Journal - record keeping
8. Information gathering (outlining, note taking, library usage, dictionaries, encyclopedias)
9. Literary forms

Reading (02)

0. Unclassifiable
1. No explicit analysis
2. Word analysis
3. Word meaning
4. Text analysis for comprehension
   1. Listening while teacher or other reads aloud
   2. Individual reading
   3. Doing exercises (e.g., dittos, tapes)
   4. Lecture or discussion with teacher or aide (no reading)
   5. Group reading (which includes discussion, etc.)
   6. Individual reading and doing exercises.

Social Studies (08)

0. General
1. Values, social attitudes and behaviors

Group Designation

1. Whole group
2. Subgroup
3. Individual

Group Size

2 digits

Supervisory Code

1. Teacher supervised
2. Other supervised
3. Nonsupervised

Location

1. In own room
2. Out of their room
3. Out of school

Process Variable

1. Read
2. Write
3. Neither
4. Both
   0. None
   1. $<$ 1/2 the time
   2. $\geq$ 1/2 the time

General

0910 - No content or activities specified in the plan for the interval.
3000 - Content area not able to be identified from statement written in plan.

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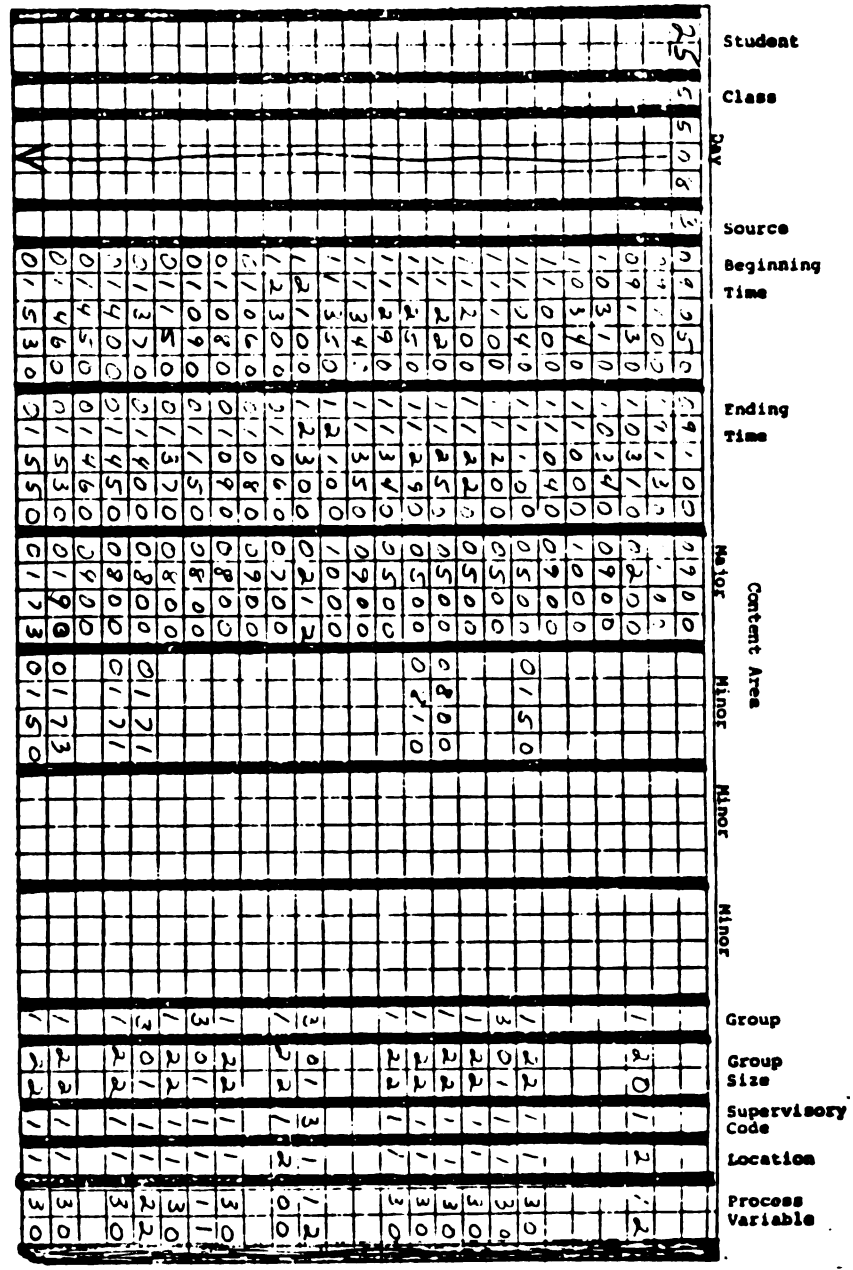
APPENDIX 3.5

APPENDIX 3.5



Coded Activities of One Student from Observation
Shown in Appendix 3.1

Student	Class	Day	Source	Beginning Time	Ending Time	Content Area: Major	Minor	Minor	Minor	Group	Group Size	Supervisory Code	Location	Process Variable
25	5	508	3	01550	02090	0173				1	22	1	1	22
				02090	02110	0173				3	01	1	1	22
				02110	02120	0173				3	01	3	1	22
				02120	02160	0173				3	01	1	1	22
				02160	02250	0173				1	22	1	1	30
				02250	02270	0900								
				02270	02280	0700				1	22	1	1	30
				02280	02320	1200								
				02320	02590	0700				1	22	1	1	30
				02590	03100	0900								

APPENDIX 3.6

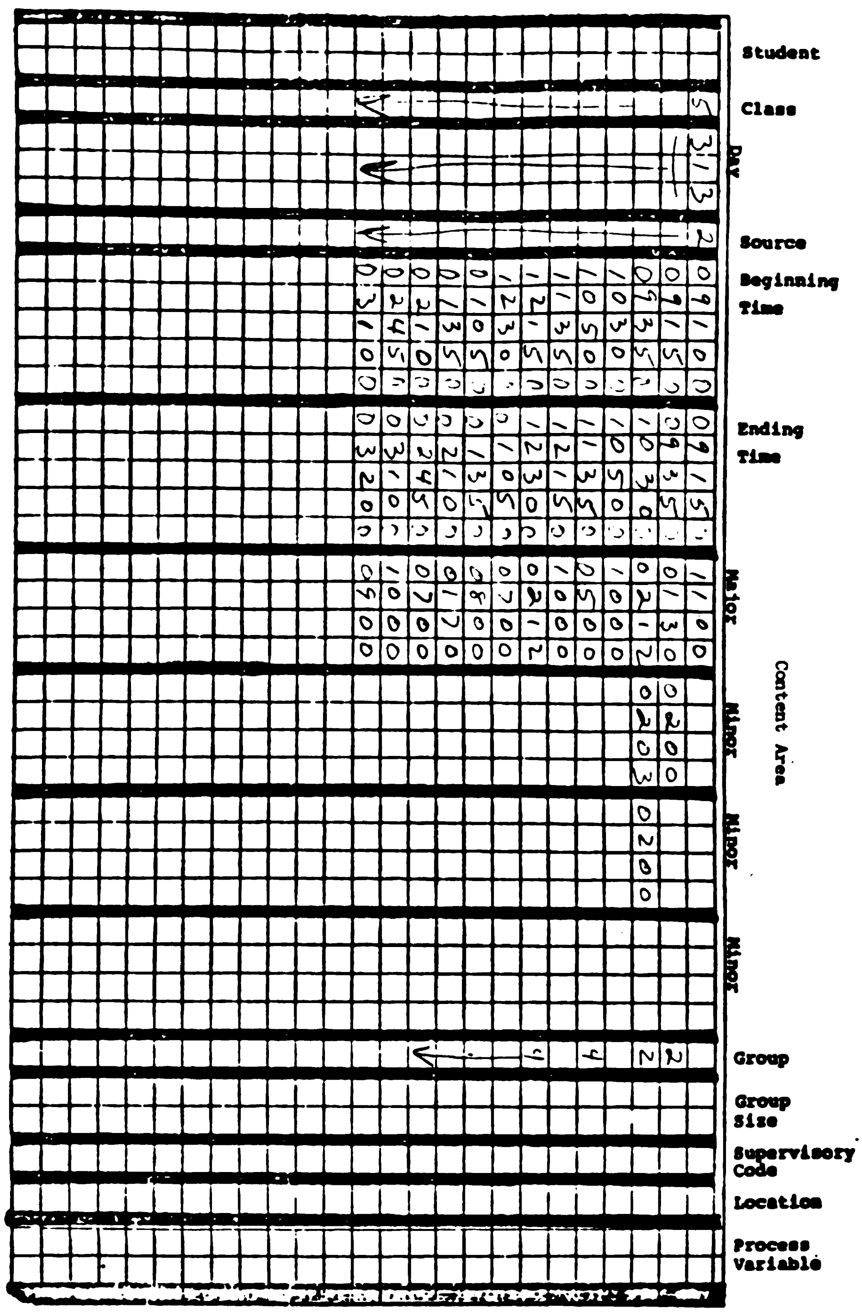
APPENDIX 3.6

Class Activity Content Combinations

Content Combinations	Code
Language Arts/Language Arts	0011
Reading/Reading	0022
Language Arts/Reading	0012
Language Arts/Art	0013
Language Arts/Math	0015
Language Arts/Social Studies	0018
Unclassified	0099
Gym/Music	0064

APPENDIX 3.7

APPENDIX 3.7



Coded Planned Time Allocations from the Written
Plans of One Teacher for One Day

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