1-1-1988

On the wrong track : equal access to knowledge and ability grouping in secondary social studies classes.

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On the Wrong Track: Equal Access to Knowledge and Ability Grouping in Secondary Social Studies Classes

A Dissertation Presented

By

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Submitted to the Graduate School of the
University of Massachusetts in partial fulfillment
of the requirements for the degree of

DOCTOR OF EDUCATION

May 1988

School of Education

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ACKNOWLEDGEMENTS

Support and guidance for this study came from many people. I routinely relied upon their concern for me and my work, though I too rarely acknowledged their patience and efforts.

I am especially indebted to Bob Sinclair, who, through his careful nurturing and prodding, has influenced my personal and professional life in profound and lasting ways.

I wish also to thank the other members of my doctoral committee, Bill Wolf and Clark Roof, whose guidance and scholarship served as examples for this work. In addition, I would like to thank Ralph Tyler, whose sage advice and well-directed criticism were invaluable.

To my colleagues in the Coalition for School Improvement, I would like to pay special note. Their intellectual and moral support provided me with the stimulation and energy to pursue this study.

Finally, and most importantly, I must thank Claire, whose love and encouragement were neverfailing, and without which, none of this would be worth doing.

ABSTRACT

ON THE WRONG TRACK: EQUAL ACCESS TO KNOWLEDGE AND ABILITY GROUPING IN SECONDARY SOCIAL STUDIES CLASSES

MAY 1988

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Ability grouping is the predominant form of instructional organization in U. S. public high schools. Proponents of this practice argue that it allows curricular content and instructional methods appropriate to the ability of students to be utilized. This study examined how course content and teaching methods differ among high school ability-grouped United States history classes. Two hundred and ninety-six students and eighteen teachers in seven high ability classes, six average ability classes, and five low ability classes participated in the study.

Two observational instruments--the Five Minute Interaction and the Classroom Snapshot--and two questionnaires--the Teacher Classroom Climate Questionnaire and the Student Classroom Climate Questionnaire--were utilized to collect data from the participants. The data from these instruments were used to examine differences among the three ability levels along seven content variables and eleven instructional methods variables found in the

research literature to be connected to increased student learning. In the analysis of the data, a variety of univariant and multivariant statistical techniques were utilized. Discriminant analysis, a multivariant technique, was especially useful in identifying differences in classroom practices among the three ability-group levels.

The data from the study supported the following conclusions.

1. The curricular content differed among ability levels along two important dimensions: classroom academic orientation and student non-involvement. High-ability classes showed greater academic orientation and higher student involvement than both average- and low-ability classes.
2. Classes from all three ability-levels were very similar on the instructional methods measured by the instruments in the study. Only one variable, variety of instructional activities, different importantly among the ability levels.
3. All eighteen classes, regardless of ability levels, were strikingly similar in their physical and instructional elements.

The findings of this study suggested that teachers in classes from the three ability levels examined in this study did not effectively alter the curricular content and instructional methods to meet student needs. These findings

add to the mounting evidence that calls for a change in the present grouping practice in American public schools.

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INTRODUCTION

Statement of Problem

Grouping students according to ability is one of the most persistent practices in public secondary schools. By most recent counts, three-quarters or more of public elementary and secondary schools use some form of ability grouping (Findley and Bryan, 1975; Wilson and Schmits, 1978; Oakes, 1985).

This practice continues despite an overwhelming collection of research which suggests that ability grouping has several harmful effects on many students within the school. Critics of ability grouping point to its detrimental effects on low-tracked students. A 1975 study, for example, noted an overall decrease in IQ scores for students placed in lower tracks (Rosenbaum, 1976). Many others have warned that ability grouping lessens dignity and self-worth in all but the highest groups. Even for these learners, evidence suggests that they limit their friends only to others of high groups--increasing elitism and arrogance among those at the top (Alexander and McDill, 1976; Eash, 1966; Esposito, 1973; Hallinan and Sorensen, 1985; Kelly, 1974; Goldberg, Passow, and Justman, 1966; Shafer and Olexa, 1971).

More alarming is the segregation of students along

racial and socio-economic lines that results from ability grouping. While researchers disagree on the reasons, they are nearly unanimous on one point: minority and economically disadvantaged children are found in low tracks in unwarranted numbers (Bowles and Gintis, 1976; Katz, 1960; Rosenthal and Jacobson, 1968; U.S. Commission on Civil Righs, 1968).

Research on academic achievement and ability grouping also seriously questions the effectiveness of sorting students by ability. Among studies conducted over the past seventy-five years, there is no consistent evidence that grouping students by ability has a positive influence on learning for any group of students.

Despite these findings, ability grouping remains the predominant instructional organization in schools. The rationale for this practice centers on assumptions about the learning process. First, students are considered to differ so greatly in their academic ability and capacity for learning that widely varied educational experiences are needed. Proponents of ability grouping argue that these educational experiences require students to be segregated into groups for effective learning to take place. Second, classes are seen as more manageable when students are homogeneously grouped. Teachers, it is argued, can more readily adapt the content of instruction to a group when the range of abilities is reduced in the class (Goodlad, 1969; Oakes, 1985).

Yet, responsible educators are once again challenging this predominant procedure of sorting students for learning (see for example, Boyer, 1983; Goodlad, 1984; Sizer, 1984, Sinclair and Ghory, 1987). Despite claims that ability grouping fosters teaching better suited to students' needs, actual classroom experiences in grouped classes remain largely unexamined. Clearly, if school decision-makers are to meet the challenges they face for providing equal and quality education, relevant and accurate information about grouping is needed to determine if ability grouping should continue as the prevailing form of instructional organization. To this end, the present study provides data about the nature of ability grouping in selected high schools and about differing academic conditions students encounter in various levels of grouping.

Purpose of Study

Specifically, two major objectives guided the study: a) to determine differences in curricular content across varied levels of ability grouping in high school United States history classes and b) to determine differences in instructional practices across varied levels of ability grouping in high school United States history classes. To fulfill these objectives, the following two research questions were answered:

1. To what degree does curricular content differ

across ability grouping levels in high school United States history classes?

2. To what degree do instructional practices differ across ability grouping levels in high school United States history classes?

Definition of Terms

The following terms play a critical role in this study. The definitions below provide a framework for further discussions.

Ability grouping

Ability grouping is broadly used to describe a variety of organizational schemes and instructional practices which derrive from them. Generally, ability grouping is the practice of establishing instructional groups according to real or perceived similarities among students on some characteristics. The criteria for seperation of students may include: teacher judgment of achievement and ability, results from intelligence or achievement tests, grades, or student or parent choice (Bolvin, 1969). While the seperation of students may be temporary with a specific, short-term instructional purpose, the expression, ability grouping, is usually reserved for group assignments lasting several weeks, months, or even years (Goodlad, 1960).

At the elementary level, ability grouping can take place either among classes or within heterogeneously grouped

classes. In schools with more than one classroom for each grade level, classes may be constituted to include students with similar scores on one or more achievement or intelligence test or teacher assessment of ability. Within-class groups for instruction in a variety of subjects are often formed in classes where students are randomly placed. Though assignment may be based upon specific test scores in related content area, assessment of reading ability is often the basis for such in-class grouping (Haller and Davis, 1981).

At the secondary level, two closely related types of ability grouping exist. Rosenbaum (1980) distinguishes between grouping by ability or achievement and grouping by curriculum. In ability-grouped classes, students with similar perceived abilities on some established criteria are placed together for instruction. Curriculum grouping is marked by differentiated curriculum for students along seperate educational paths or "tracks." Often characterized as academic, general, or vocational, these tracks usually have explicitly different goals and educational experiences for students (Eyler et al., 1982). Studies of the placement process of students into these tracks, however, suggest that there is little difference between ability-grouping and curriculum grouping (Bowles and Gintis, 1976; Brophy and Good, 1974; Davis and Haller, 1980; Jencks, 1972; Rist, 1970; Rosembaum, 1976; Schafer and Olexa, 1971). Student placement and academic treatment within these two

interrelated types of ability-based grouping schemes appear to be nearly identical.

Within the context of this study, which focuses upon the experiences of students in history classes at the high school level, ability grouping is used to describe the practice of seperating students into distinct classes for providing different educational treatments on the basis of their educational and occupational potential.

Instructional methods

Instructional methods are the procedures and operations that teachers utilize to induce student learning. These are distinct from intended learning outcomes or activities carried out by students within or outside of the classroom. Within the study, instructional methods are represented by specific instructional techniques and behaviors used by teachers in the classroom.

Curricular content

The concept of curriculum and related terms such as curriculum evaluation, curriculum development, and curriculum content have been broadly discussed and disputed by education scholars. This debate is fed in part by differing doctrines of educational values and practices (Williamson, 1983). The purpose here is not to enter into this discussion, but to pose a workable, though undeniably debatable, definition of the concept. Within the context of this study, curriculuar content is seen as the guided

school-related experiences students have for intended learning outcomes. Operationally, curricular content includes the goals established for students and specific opportunities to master these goals.

Review of Related Literature

In exploring how the daily experiences of students within various levels of ability-grouped classes differ, the study draws upon a large body of related work. The review of literature, which develops a theoretical framework for the study, is presented in three parts. In the first part, selected literature is reviewed to establish the rationale for ability grouping and its effects upon student growth, including both academic achievement and affective development. In the second part of the review, existing knowledge of differentiation of instruction in ability-grouped classes is outlined from the literature. The final part of the review focuses upon selected literature on effective teaching practices to determine instructional methods identified as inducive to student learning.

Significance of Study

In attempting to understand tracking in American schools, one is confronted with an enormous body of research on the subject. Much of this research considers the

influences of tracking upon student outcomes. By comparing the effects of ability grouping upon students' academic and social development, these studies provide important, though somewhat fragmented and contradictory, insights into the effects of ability grouping.

Largely unexamined, however, has been the process and content of tracking in classrooms. The theoretical significance of this study lies in its focus upon those processes associated with tracking which shape the experiences of students. In concentrating upon experiences in classrooms, this study shifts concern from achievement outcomes of tracking to the daily classroom life of students. Such an approach avoids two major pitfalls inherent in much previous research. First, examination of processes reduces the reliance upon achievement and intelligence tests to gauge the effectiveness of grouping practices. Decisions about curricular content and instructional practices can incorporate a broader range of criteria without relying upon instruments which have been attacked as socially and culturally biased. Second, this approach focuses attention towards the interactions of students and teachers which influence student performance. While extracurricular experiences may contribute to a student's learning, it is the classroom that provides the primary educational and socializing experiences (Morgan, 1977). By exploring the educational experiences of students from different ability groups, this study provides a clearer

understanding of how classroom environments relate to student outcomes.

Furthermore, this study is important because it contributes data about ability grouping and educational inequity within schools. Given the existence of student outcomes favoring the socially and economically advantaged, possible differences in educational treatment found in classrooms pose difficult questions for educators. In deliberating upon these differences in curricular content and instructional practices, educators must scrutinize carefully the educational justification for these differences. This study hopes to generate discussion about the appropriateness of ability grouping for promoting equal educational opportunity.

The present study is also important because it provides information about existent instructional practices within tracking levels. Current information concerning ability grouping is needed to assure a realistic understanding of its influences on schools and learning. This information gathered from a broad range of schools highlights the nature of present grouping practices in schools and provides information for improving how schools group students.

Delimitations

The extensive and complex nature of grouping and its broad and powerful influences upon schooling give special

importance and urgency to research about this subject. At the same time, however, the breadth and significance of ability grouping pose special problems in research. This section will discuss several delimitations implied by the approach of the present study.

First, the confidence in generalizing the findings of this study is affected by decisions made to limit the scope of this research. This study focuses exclusively upon the classroom experiences of students in a selected population of ability-grouped high school classes in United States History. Each of these limitations is discussed below.

The decision to concentrate upon high school classes is based upon several considerations. Ability grouping is more prevalent in high schools than in elementary schools (Findley and Bryan, 1971; Wilson and Schmits, 1978; Oakes, 1981b). Its influence would seem to be broader, if not more powerful there. In addition, unlike elementary classes that commonly are grouped by age and then subdivided within the classroom for specific subjects and activities, ability-grouped classes in high schools are usually physically distinct entities. High schools, then, provide both more abundant and clearer examples of ability grouping for study.

The determination to examine one academic subject is also grounded in methodological considerations. As this study concentrates upon the processes which occur in classrooms, comparisons of content selection and pedagogical techniques across subjects would have had little meaning.

Focusing upon one subject helps eliminate confounding influences arising from the nature of different academic disciplines and pedagogical traditions. Since only classes from one subject are considered in this study, the findings, of course, can not reasonably be generalized to other subjects.

United States History courses are especially appropriate for the study of ability grouping. As a required course in most high schools, these classes serve nearly all students in the school at one time or another. Unlike other classes, which may have prerequisites which limit enrollment, U. S. History classes are offered to most of the school population.

Second, the results of this study will be limited by the school sample from which data were collected. Information was gathereded from seven public schools in the state of Massachusetts. No effort was made to include private schools, nor other secondary schools serving special populations. While the sample was chosen to reflect a broad range of demographic characteristics, the findings about these schools can not necessarily be applied to a larger population.

Third, all classroom observations were made by the researcher. This, along with the use of instruments that enabled objective collection of data to be carried out, importantly increased the consistency of the data-collection process. Further, observation data were supplemented by

data drawn from both the student and teacher questionnaires. Nevertheless, the possiblility of observor bias can not be wholly discounted.

Fourth, a cautionary note must also be issued concerning the variables used in examining effective teaching practices in this study. These variables necessarily include only a small part of those behaviors to which students may be daily exposed in classrooms. While those behaviors chosen for this study are thought to be highly associated with learning, there is no proof that a causal relationship exists. Until knowledge of influences of instruction upon learning is more exact, these variables will remain a valuable, though imperfect, tool for comparing the teaching that occurs in classrooms.

In sum, decisions concerning the design of this study were made to ensure rigor and precision. The procedures and techniques used have been developed to reduce difficulties and address anticipated shortcomings. By being aware of the delimitations of the study, it is possible to interpret findings in a manner that matches the level of confidence of the data.

Approach to Study

Three interrelated stages were developed to address the research questions: sample selection, data collectiona and data analysis. Initially, a sample of twenty-one ability-

grouped U.S. History classes in seven demographically diverse public high schools in western Massachusetts was chosen. Class observations were conducted in each classroom using two observational instruments to collect data about classroom events and activities. On a second visit to each class, all students and teachers in the sample filled out questionnaires developed specifically for the study to solict information about classroom processes. The data were organized around the nineteen variables related to important concepts of instructional practices and curricular content. A variety of univariant and multivariant statistical techniques were then used in analyzing data on these variables to answer the two research questions.

Chapter Outline

The chapters that follow provide a detailed discription of the study. Chapter II develops a theoretical framework for the important concepts and approach of the study. Chapter III describes the design and procedures used in carrying out the study. In Chapter IV, the findings of the study are presented as they relate to the research questions. Chapter V summaries the study and presents conclusions and implications of the study. Several appendices provide additional information that, though of secondary importance to the main thrust of the text, may be of interest to the reader.

C H A P T E R I I

THEORETICAL FOUNDATION

In this chapter, the theoretical foundation for the study is established. The chapter is divided into three sections which develop important conceptual elements of the study. First, the rationale upon which ability grouping is based and its academic and affective effects on students are discussed. Next, existing literature on teacher differentiation of instruction and content within ability grouped classes is examined. Finally, important variables related to student learning are identified from research on effective teaching.

Rationale and Effects of Ability Grouping

Rationale

Grouping by measured ability is based upon several assumptions about the learning process. First, students are thought to differ greatly in their academic ability and potential. To facilitate learning for all students, varied educational experiences are seen as necessary. These instructional activities differ to such an extent that students must be divided into groups of similar members for effective learning to take place. In classes where the range of abilities has been reduced, teachers presumably can more effectively adopt the content of instruction to the

needs of the students. Materials and methods can also be more easily modified by the teacher in grouped classes. Finally, students learn better within ability grouped classes because they are neither frustrated by comparisons with more talented students nor over-confident because of their higher level of performance (Heathers, 1969). Thus, narrowing of the class ability, then, allows teachers to teach more effectively resulting in more learning by a greater number of students. (Goldberg, 1966; Borg, 1966; Heathers, 1969). Of course, underlying these assumptions is that the range of learning-related differences can be accurately and fairly assessed, and students accurately placed into appropriate groups without undue difficulty (Heather, 1969; Oakes, 1981c).

Ability grouping and academic achievement

A great deal of research has looked at the relationship of ability grouping to academic achievement; yet, the manner in which grouping affects students remains distressingly unclear.

Though ability grouping schemes have been used for more than a hundred years, little attempt was made to evaluate their successfulness until the beginning of the twentieth century. While earlier studies were conducted, only in 1916 did a study of homogeneous grouping use controlled experimental methods (Whipple, 1936). The 1920's and early

1930's saw a great increase not only in the practice of grouping in schools, but also in efforts to study its effect on learning. These studies, like many of those to follow, did little to settle the usefulness of grouping as a teaching technique.

In one of the first major reviews, Miller and Otto summarized 20 studies in 1930. They concluded that "so far as achievement is concerned, there is no clear-cut evidence that homogeneous grouping is either advantageous or disadvantageous." The effectiveness of grouping, they added, was dependent upon "proper adaptation in methods and materials" (1930, p. 102).

Two years later, in a review of 108 practical or experimental studies on the effects of ability grouping on student achievement, Billet also reported mixed results. After judging 104 of the studies as inadequately controlled, Billet found two studies suggesting favorable effects, one showing no effect, and one attributing negative effects to grouping. In a retrospective review of research studies conducted between 1920 and 1930, Ekstrom (1959) also found no consistent effects of grouping. She identified 13 studies with findings favoring ability grouping, 15 where grouping either was detrimental or had no effect, and five with mixed results.

In 1936, as a reflection of the relevance of the topic, the National Society for the Study of Education devoted its yearbook to a discussion of the practical, theoretical, and

experimental considerations in ability grouping. While taking no decisive stand on the issue, the yearbook pointed out several major trends in the literature. Notably, Cornell (1936) concluded:

> The results of ability grouping seem to depend less upon the fact of grouping itself than upon the philosophy behind the grouping, the accuracy with which grouping is made for the purposes intended, the differentiation in content, method, and speed and the technique of the teacher, as well as upon more general environmental influences. Experimental studies have in general been too piecemeal to afford a true evaluation of the results, but when attitudes, methods and curricula are well-adapted to further adjustment of the school to the child, results, both objective and subjective, seem favorable to grouping. (p. 302)

As a result of the inconclusiveness of research on ability grouping and criticism from the progressive education movement with its democratic emphasis, the practice of grouping became less common during the twenty-year period between 1935 and 1955. Though some schools continued to use ability grouping as an organizational technique, few studies on its effectiveness were carried out during this period (Otto, 1950).

The concern for education which followed the Soviet launching of the first satellite rekindled interest in homogeneous grouping as a possible technique for more effective learning. Research on grouping increased dramatically, as well. During the years between 1959 and 1967, more controlled studies on ability grouping were carried out than during all the previous years combined (Heather, 1969). Accompanying this increase in the quantity of research was the use of sophisticated statistical

techniques and analyses. Such techniques facilitated the comparison of separate populations within studies; intraschool differences as well as interschool differences could be analyzed.

Since the 1950's the effects of grouping upon students of different measured abilities are well-documented, if not totally consistent. Goodlad, in his 1960 article in the Encyclopedia of Educational Research observed a small advantage for low-placed students within a grouping arrangement.

> The evidence slightly favors ability grouping in regard to academic achievement, with dull children seeming to profit more than bright children in this regard. The advantage to bright children comes when they are encouraged to cover the usual program at a more rapid rate. (p. 224)

Contradicting evidence was found by Daniels (1961) in his study of elementary schools. Having reviewed both American and British sources, Daniels concluded that ability grouping lowered the average level of attainment of all pupils, slightly reduced the attainment of "bright" children, and markedly retarded the educational progress of "slower" students. Daniel's work, later supported by Heathers (1969), suggested that grouping widened the dispersion of academic achievement among the already-educationally advantaged and disadvantaged students (Heather 1969).

A large-scale study of more than 8,000 seventh and eighth grade students in 28 different schools by Millman and Johnson (1964) failed to find that academic improvement was

directly related to the presence of grouping. These researchers warned that implementing a grouping scheme by itself was no assurance of increased academic performance.

Borg (1966), in a four-year study of nearly 4,000 students, provided one of the most far-reaching investigations of the effects of grouping on achievement. In comparing the achievement of students in two adjacent school systems in Utah--one of which used ability grouping with accelerated curricula for advanced students, the other random grouping with enrichment--Borg identified no broad superiority for homogeneous groups or heterogeneous groups. For specific types of students, however, Borg noted several achievement differences.

> When data for the different ability levels were considered separately, achievement advantages of the two grouping systems, though small, tended to favor ability grouping for superior pupils and random grouping for slow pupils. As was hypothesized, the achievement results for average pupils did not consistently favor either grouping treatment. (p. 84)

Another comprehensive study published in 1966 revealed important results concerning the effects of grouping on achievement. To measure the effects of grouping per se without the planned modification of content or methods, Goldberg, Passow, and Justman (1966) studied the effects of class placement within both ability grouped classes and heterogeneously grouped classes of forty-five elementary schools in New York City. Their findings revealed that

> ...simply narrowing the ability range in the classroom ... is not associated with greater academic achievement for any ability level. (p. 161)

One of the most significant summaries of research related to the results of ability grouping was done by Warren G. Findley and Mirian M. Bryan (1971). In keeping with most previous reviews, Findley and Bryan found no consistent positive value for increased learning attributable to ability grouping. In studies where significant effects occurred, the gains

> ...for the learning of high ability students is more that offset by evidence of unfavorable effects on the learning of average and low ability groups, particularly the latter. (p. 54)

Some recent studies, however, lend support to the positive influence of grouping on achievement. In a 1978 study of high school students, Alexander, Cook, and McDill (1978) found tracked eleventh graders outperformed non-tracked students of similar ability.

Stallings (1978), in summarizing the findings of a large-scale study of remedial reading programs in the secondary school, also provided evidence for the success of tracked students. Above-average students made less progress in mixed-ability groups than the rest of the students. While recognizing the possible ceiling effect of the test, Stalling concluded that

> ...for greater efficiency in teaching and learning reading skills, students should be placed in classes with students of similar reading ability. (p. 65)

Venezky and Winfield (1978) also suggested that ability grouping may contribute to the successful learning of certain subjects. In a study of schools that demonstrated outstanding results in teaching reading, homogeneous

grouping was strongly emphasized. Ranges of student ability in the classroom were identified as limiting the extent to which teachers could successfully adapt to individual student needs.

Froman (1981), in one of the most recent reviews of ability grouping literature, identified no overwhelmingly clear and consistent effects upon student achievement. He concluded that certain weak trends might be supported by the literature. Froman found some evidence that high ability students may experience some benefits in their cognitive development. Middle groups, it seemed, benefit little from being homogeneously grouped. Low students, on the other hand, tend to perform at lower levels when placed in class of students of the attributed ability.

In their analysis of data from the High School and Beyond study, Vanfossen, Jones, and Spade (1986) identified certain trends in the learning of students in classes grouped by ability. Using a regression model which controlled for previous academic performance and different courses taken, they noted significant differences in the effects of being in different tracks. Students in the high track increased their academic performance substantially between their sophomore and senior years. Middle-track students showed moderate increases, while low track students demonstrated little academic progress.

A variety of critics of ability grouping have also identified detrimental secondary effects of grouping upon

individual students. One damaging criticism emerges from the work of James Rosenbaum (1975, 1978) of Yale University. In studies of a white working class high school, Rosenbaum found that tracking had a marked influence on changes in IQ scores. Within a socially homogeneous high school with a highly stratified five-track system, he noted an increase in the mean IQ scores for upper groups and a decrease of the mean score for lower groups. Additionally, in the upper two tracks there was a significant divergence in individual intelligent scores; for the lower tracks, he found a convergence of scores. He concluded that "track structure presents very different environments to students in different tracks" that seemed to produce changes even upon assumed stable measures of innate ability (p. 53).

Grouping and affective influences

While the vast majority of studies of ability grouping have been concerned with achievement, criticism of grouping has often centered upon its effects on the non-cognitive development of students. Several limitations, however, attend much of the research in this area. First, as Borg (1966) pointed out, measurement of the affective domain lags far behind more quantitative research. Though during the last twenty years more sophisticated techniques have been developed, current measurements provide only tentative evidence. A second is the difficulty in predicting accurately the time needed for changes in individual perceptions and personality to manifest themselves. The

failure to perceive changes may reflect the brevity of the treatment period and not the absences of effects. A final caveat concerns the complex nature of the environment the student is in. Suggestions that research can identify the effects of one factor among the barrage of influences shaping affective development should be treated with skepticism. In sum, when attempting to understand the effects of grouping on such an important area as the affective domain, one is frustrated by the nature of the environment and the difficulties in measuring the influences of instructional organization upon it. Despite these reservations, the literature on the effects of ability grouping on non-cognitive growth of students remains an integral aspect of the research in the field.

Early research often pondered the effects of grouping upon these non-academic areas. In their 1930 review of the literature, Miller and Otto reached few conclusions about the most advantageous method for grouping students. They did, however, question the manner in which grouping related to affective characteristics of pupils. They asked if

> ...the social and psychological advantages coming out of homogeneous classification will justify the practice of homogeneous grouping. (p. 101)

Billet, in his 1932 review of 140 studies, posed a similar concern. Billet identified trends which suggested that some academic benefits resulted from segregating "slow pupils" from normal and above-normal pupils. He warned, however, that serious questions remained as to the "stigma

upon the dull" which grouping seemed to create (p. 120).

Self-concept. An important part of the upsurge of research on grouping which occurred in the late 1950's and 1960's focused upon its effects on students' affective development. In his examination of the research on grouping, Eash (1966) posed several warnings about the use of ability grouping. Among these was his concern about the influence of grouping practices upon students' sense of dignity and self worth and attitude towards other children. Eash warned that ability grouping was probably not the solution to broad problems of learning. In view of possible effects of grouping schemes upon students self-perceptions, educators should consider carefully

> ...the establishment of social climates that will encourage the intellectual, social and personal development of every child without detrimental effects on individual children. (p. 431)

In Borg's comparative study of two Utah grouping systems--one with curriculum differentiation in ability-grouped classes and the other with curriculum enrichment in randomly-grouped classes--he found no consistent differences between groups on values and aspiration levels of students. Borg's work suggested that students developed no greater sense of inferiority at any ability level in the grouped classes than in the randomly selected classes.

Several other studies conducted in the late 1960's relating self-concept to grouping provided little evidence of negative effects on students. In a 1966 study conducted by Goldberg, Passow, and Justman, grouping was found to have

small but discernible effects on students' self-concept. Self-assessments were higher for low-ability students, slightly lower for high-ability students, and unchanged for middle-level students. Other non-academic variables--such as interest and attitudes toward school and attitudes towards students of different abilities--were not detected. Likewise, a 1968 study by Marascuila and McSweeney (1972) found no significant differences in student self-image stemming from ability grouping. A similar lack of evidence linking grouping to lower student self-concepts was reported by Dyson (1967).

More recent research has had a tendency to contradict these studies. Esposito's 1973 review of the findings reported in research between 1930 and 1972 raised serious questions about the impact of grouping procedures upon students' affective development. He reported that grouping influenced students within different ability levels in varying manners. For students in high ability groups, he found evidence of inflated self-concepts. Lower and average groups, on the other hand, generally had lower self-esteem.

Delos Kelly (1974) also found track position directly related to self-esteem, with lower-track students having the lowest scores on self-concept measures. His work additionally traced a deterioration of students' self-image among students in lower groups. His conclusion supported earlier findings by Shafer and Olexa (1971) and Alexander and McDill, (1976).

Grouping and democratic ideals. A more general criticism of homogeneous grouping has focused upon its negative effects on the social development of students. Critics have argued that an innate contradiction exists between the democratic principles reflected in the laws and ideals of this country and systems of school organization which segregate students from one another. Rosenbaum's 1978 study of a white, working-class high school suggested that this democratic ideal is given at least token expression in official school policy. Quoting from a student handbook, Rosenbaum noted that the

> ...school feels that classroom diversity is basic to American democracy and the diversity can be useful in the students' learning and in their lives. Students should learn to understand one another. The gifted student should in some way know the problems of the slow learner. (p. 240)

Other educators have voiced similar concerns for the importance of the socializing aspects of schools. In their examination of research and assessment of grouping practices, the Research Committee of the Indiana Association for Supervision and Curriculum Development (1960) listed nine considerations for ability grouping implementation. The study warned that grouping might have a detrimental effect on "the development of general education skills, those skills which are required of all citizens" (p. 5). Furthermore, they expressed their fear that ability grouping would create an educational environment which would emphasize "the attainment of academic goals at the expense of other broader behavioral goals" (p. 6).

Maurice Eash (1966), in his discussion of implications of grouping practices on learners, forcefully reiterated these ideas. The paramount function of research on ability grouping, Eash claimed, was to

> ...uncover those practices which are supportive to developing democratic personalities and to expose for what they are those practices which are inimical to democratic processes. (p. 91 in Morgenstern, 1966)

Many educators who supported ability grouping, Eash continued, were deluding themselves about the "basically discriminatory, antidemocratic" (p. 91) nature of grouping in schools. Reviewing the literature, Eash concluded that by itself ability grouping did not improve achievement in children and could possibly be detrimental to some groups. He further noted the difficulty in placing students accurately in groups. Given these ambiguities, Eash warned that grouping diminished the role of schools as socializing and democratizing agents. He admonished administrators that, while ability grouping might accentuate narrow academic achievement, it also would promote "group norms which are antithetical to norms that foster societal cohesion and individual societal responsibility" (p. 91).

Ogletree and Ojlaki (1971) drew upon role theory to reach similar conclusions to those of Eash. After outlining the importance of role development for the affective growth of the child, they asserted that homogeneous grouping established roles and expectations within the educational setting which reflected the values and upbringing of middle-class students. Culturally-disadvantaged children, whose

values and experiences differed significantly from those embodied in the organizational framework of the school, were effectively blocked from reaching those expectations that were incongruous with their culture. In sum, they found that ability grouping segregated students along class and cultural lines, thus diminishing the socialization process which should be fostered by schools.

Summary. In attempting to determine the effects of grouping upon students, it has been necessary to look at a large body of research. These works have often been fragmented and contradictory. Emerging from this examination, however, is a general pattern of the manner in which grouping influences students. Specifically, the literature suggests that grouping has few short-term effects upon achievement as measured by standardized test. Grouping may also actually increase differences in academic ability and achievement among students. Further, for reasons that have not been adequately identified, grouping exerts a negative effect upon the self-concept and self-esteem of lower-track students. Finally, by separating students into instructional groups of limited socioeconomic and racial diversity, grouping tends to subvert basic democratic principles which should be encouraged by schools.

Grouping and socioeconomic and racial bias

Perhaps the most alarming aspect of ability-class grouping is the segregation of students along racial and socioeconomic lines that seems to result with its use. This

pattern of segregated classrooms has been well-documented in the research literature, with special attention devoted to the subject during the late 1960's and early 1970's.

Placement and desegregation. A great deal of research has examined grouping and its link to the racial composition of grouped classes. In the highly publicized Coleman Report (Coleman, et al., 1966), black students were found to be overrepresented in lower groups. The study asserted that 32 per cent of all black children were in lower-track classes compared to 24 per cent of white children.

Similar results were presented by Rosenthal and Jacobson (1968). In their study of 650 pupils in a California elementary school, both low-income students and Mexican-Americans were assigned more frequently to low tracks than their Anglo and middle-class schoolmates. These differences persisted even when IQ was controlled for.

Jones, Erickson, and Crowell (1972) reported supporting evidence. Though blacks constituted nearly 50 per cent of a seventh grade class, they made up only one third of the academic track student population. Overall, twice as many blacks as whites were placed in the lowest track. Analysis of student placement when controlling for achievement produces even more startling results. Eighty per cent of upper-class students with qualifying scores were placed in the top track; only 47 per cent of qualified lower-class students were in the upper track. Patterns in placement in the lower track were even more pronounced. Only two per

cent of upper-class pupils, versus 85 per cent from the lower-class, who qualified for placement were actually in the low track.

These studies--as well as the work of Findley and Bryan (1971); Esposito (1973); U.S. Commission on Civil Rights (1976); and Green and Griffore (1978)--have convincingly established this discrepancy in placement of poor and minority students and more affluent white children. Use of ability grouping, particularly within schools having large minority populations, is likely to create classrooms segregated by race and socioeconomic status.

Whether this segregation is a reflection of differences in academic achievement or willful or subtle racial and class bias has been a hotly debated question. Participants in the debate have formed themselves into two camps, sometimes referred to as the "revisionist" and the "meritocratic" positions (Rehberg and Rosenthal, 1978). Many have argued that tracking innately discriminates against racial minorities and other students from lower-class backgrounds, effectively denying opportunities for social mobility available to the middle class (Schafer and Olexa, 1971; Katz, 1975; Bowles and Gintis, 1976). Others reasoned that grouping's links to socioeconomic status reflect relevant factors such as student ability, aspirations, and parental expectations (Davis and Haller, 1980). They argue that when students are allowed to choose their own track based upon an accurate assessment of their

likelihood to succeed, this association with social class will occur (Heyns, 1974; Rehberg and Rosenthal, 1978). Davis and Haller (1980) have suggested that this disagreement may in part be a result of temporal and methodological differences in research. Research which found strong socioeconomic effects were generally done before 1960, while studies supporting the meritocratic view have been completed more recently, often using large-scale survey data and employing multi-variate statistical techniques.

A 1978 study provides a disturbing synthesis of the meritocratic and revisionist positions. In their study of high school tracking and educational stratification, Alexander, Cook, and McDill (1978) found little evidence of direct socioeconomic ascription in track placement. While asserting that college-track placement enhances achievement and increases the likelihood of acceptance to college, they found no pernicious motivation underlying these decisions. They identified measured ability, junior high school achievement, and educational aspirations as the major determinants of curriculum assignment. They noted, however, that

> ...over 60% of the variance in placement is left unexplained by these factors; thus, criteria other than objective ability and performance are quite important in the allocation of resources to students. (p. 64)

They concluded that through the unrecognized consequences of administrative practices, tracking in secondary schools is contributing to educational and socioeconomic inequalities.

A recent examination of data from the High School and Beyond study provided further evidence of ability grouping's segregating effects. While Vanfossen, Jones, and Spade (1986) noted a strong relationship between student track placement and previous academic performance, they also identified strong discrepancies among placement of students from different socioeconomic backgrounds. Though 53 percent of students from the highest SES-quartile were found in the academic track, only 19 percent of students in the bottom SES-quartile were in this top group. Examining students from the top academic achievement quartile, they also found that nearly 28 percent fewer low-SES students than high-SES students were in the highest track.

Placement inflexibility. These effects of this segregation by race and social class are exacerbated by the rigidity of grouping assignments. As student aptitudes which are used for tracking classification are considered stable characteristics, placement is seldom re-evaluated (Oakes, 1981b). Once assigned to a level, students tend to remain in the ability group.

Daniels (1961) reported overwhelming stability in group placement. While teachers perceived changing tracks to be a common occurrence (about 17 per cent of students), Daniels detected movement by only 2 per cent.

In examining student mobility patterns within ability-tracked schools, Schafer and Olexa (1971) also found little flexibility.

> Only 7 per cent of those who began in the college-prep track shifted to the non-college-prep track, while only 7 per cent moved in the other direction. (p. 36)

This data failed to support what Schafer and Olexa had identified as the theoretical justification for tracking: to provide students the special educational experiences which would allow them to move up into higher tracks.

Jones, Erickson and Crowell (1972) provided similar observations. In examining mobility patterns for grades seven through nine, blacks were found to be nearly twice as likely to be moved downward from an initial high track than whites. Though the percentage of blacks and whites who experienced upward mobility in the tracking system was roughly equivalent, such movement was small when compared to reassignment black students to lower classes.

Placement procedures. Despite the long-lasting effects of placement decisions, the classification process is seldom clearly defined or consistently carried out. In her technical report on ability tracking using data from Goodlad's A Study of Schooling, Oakes (1981b) noted that placement in schools is often a piecemeal operation based upon informal policies. Of the 38 schools from which data were drawn for the study, only two had documents which outlined tracking placement. Estimates of the extent of tracking by teachers and administrators were often quite different from proportions calculated from class schedules or observation. In one school, parents and teachers were often ignorant of the existence of ability grouped classes,

as the practice was disguised "to avoid damaging the children or parents" (p. 4). Oakes also found discrepancies between policies and practices within schools where policy was clearly stated. In another high school which officially had a stated policy of no homogeneous grouping, discussions with the principal revealed students were guided to choose classes "appropriate for their expected futures" during the registration process (p. 5). Oakes concluded that

> Tracking is a complex phenomenon in schools and, while an integral part of the organizational structure at most schools, it is obscured by a variety of factors. (p. 6)

Grouping and testing. One clear effect of ability grouping upon schools, however, is the reinforcement of the use of standardized measurements. A great deal of controversy has been aroused by the research on testing and ability grouping.

Testing is a tremendously wide-spread and important aspect of American schooling. An estimated 300 million dollars is spent annually in testing public school students (Rivers et al., 1975 in Bryson and Bentley, 1980). Early use of testing in schools, which began around the turn of the twentieth century, received a powerful boost from the wide-spread use of intelligence tests during the First World War. Throughout the twenties, it was used pervasively for homogeneous grouping in schools (see Nolte, 1975). While criticism from the progressive education movement lessened its importance from about 1930 to the mid-1950's, it regained predominance with the emergence of federally-

mandated resegregation. Despite fervent attacks upon its use in the late 1960's and 1970's, the testing movement has continued to gain momentum and tests continue to be widely used for grouping and placement purpose (Bryson and Bentley, 1980).

Student placement in ability groups is generally based on the use of standardized achievement or aptitude tests (Oakes, 1981a). Critics have focused upon two key issues of testing and ability grouping. The first contention is the inappropriateness of standardized tests for placement decisions of students into broad categories. A significant amount of recent research has pointed out the wide range of skills and abilities utilized in schools. Standardized test, especially intelligence tests or general achievement tests, provide inaccurate measurements of these diverse range of skills (Heathers, 1969). These tests, however, are a common part of criteria for both elementary and secondary placement decisions.

Critics also contend that standardized test incorporate racially and economically based standards (Bowles and Gintis, 1976; Collins, 1977; Persell, 1977; and Squires, 1979). Because of either the content or the norm group of a test, these tests are often ineffective measures of large groups of students--especially students with language or cultural differences. As most tests are standardized using white-middle class norms, children from low socioeconomic homes predictably score lower than students from average- or

above average-income homes (Bryson and Bentley, 1980).

The use of standardized tests for ability grouping placement, then, seems to reinforce segregation by race within schools. Using these instruments greatly reduces the number of lower socioeconomic students who qualify for upper-track placement.

Summary. The body of research reviewed here clearly points to a complex mechanism for sorting students by ability that encourages the creation of environments which exclude and penalize important groups of students. Despite claims to the contrary, it is apparent that minority and low socioeconomic-status students are much more likely to be placed in lower tracks, and their high-SES counterparts placed in higher tracks. This pattern seems to persist regardless of the abilities of the students being placed. Once placed, there are very few opportunities for students to move to a more appropriate level. Minority students, in particular, rarely are relocated to high groups after initial placements are made. Placement procedures, often ill-defined and rarely explicitly stated, and standardized tests, which consistently place poor and minority students at a disadvantage, diminish the opportunities for minorities and culturally different groups from ascending to the most educationally and socially valued levels. If varying educational experiences are provided to students in different tracks, students of various socioeconomic backgrounds have substantially different opportunities to experience them.

Curriculum Differentiation

Little research exists that examines teachers' behaviors within ability-grouped classes. With emphasis for the most part upon student outcomes, research findings about teachers have been less than conclusive. This ambivalence is reflected in the lack of importance often attached to the issue of differentiated instruction in many studies. In 1962, Passow highlighted this irregular nature of the research, pointing out that some studies differentiated instruction for groups while others kept instruction the same for all groups. In general, he said, classroom instruction by the teacher is viewed as an independent variable which makes no contribution to outcomes. Even where data on the independent variables were collected, these data rarely provided more than limited details of teachers' activities. Recent trends towards meta-analysis, such as the 1982 analysis of 52 studies of ability grouping by Kulik and Kulik, have continued to downplay the role of the teacher.

Teacher differentiation of instruction and content

A few studies have given attention to teacher differentiation of instruction within grouped classes. Goldberg, Passow, and Justman's 1966 study of ability grouping provided some enlightenment into the teacher

behavior in grouped and non-grouped classes. They reported that teachers did little to change the content and methods for ability-grouped classes. Where differentiation occurred, they found that it was usually associated with less material in some subjects being taught to certain low-ability classes. They concluded that narrowing the range "led teachers to set lower standards" for low ability pupils despite apparent benefits of exposure to advanced material experienced by slower pupils in heterogeneously grouped classes (p. 91 in Morgenstern, 1966).

In his 1967 article, Heather (1967) presented further evidence that teachers used different methods and stressed varying skills and aptitudes for students within separate ability groups. From his data, Heather maintained that in classrooms composed of slow learners, teachers emphasized basic skills and used drill and practice a great deal. For high-ability classes, conceptual learning was stressed, with students encouraged to conduct independent projects. Heather's work supported a previous national study of teaching English in high school by Squire (1966) that found that teachers employed dull, unimaginative methods to teach slow-learning groups.

In a more recent ethnographic study of two teachers and their policies for grouping students into reading groups, Paula Stern (1981) made several noteworthy observation about teachers within classrooms using ability groups. The study, conducted over a six-month period in a university-affiliated

elementary school, found that teachers regularly differentiated instruction for the two groups. In the low group, procedures, encoding, and basic comprehension skills were prescribed. For the high group, teachers exhibited more flexibility in procedures and assignments and emphasized sophisticated skills and comprehension.

While Froman (1981) found little evidence of large-scale differentiation of instruction in ability groups, he did report limited data to support claims of alteration of instructional techniques to fit the abilities of students in grouped classes. He suggested, however, that the failure of teachers to attend to the non-academic needs of students, the cognitive and developmental needs of students within groups, may explain its failure to produce the results its proponents claim for it.

Froman further argued that grouping was only effective when "instructional methods are conscientiously adapted to student needs with ability grouped classes" (p. 10). Citing recent research on grouping students within vocational education programs, Froman pointed to the successful use of homogeneous grouping to maximize student learning in the Coordinated Vocational Academic Education program. The CVAE Program attempted to address the developmental and academic needs of its academically and economically disadvantaged population by merging special remedial instruction, carefully selected content, and individual counseling. Froman noted

> ...by adjusting the methods and materials used to fit specific student needs in the homogeneous classes found in the CVAE Program, ability grouping can be turned into a productive means of classroom organization. (p. 7)

This careful attention to the whole student by the teacher, Froman proposed, is a necessary requisite for student success. Unfortunately, he reported that it is rarely an integral part of school programs which utilize ability grouping.

Recent research on teacher decision-making and ability grouping by Richard Shavelson (1982) suggests that grouping may actually hinder such an adaptation to the needs of individual students. In a penetrating critique of the effects of differentiated planning for ability groups, Shavelson asserts that grouping serves as an adaptive technique by teachers to difficult instructional demands of a diverse student population. As traditional instruction can be more easily adjusted to groups of similar students than to groups of dissimilar students, grouping allows teachers to adapt content and methods which are more appropriate for the general ability of the group. This also has important advantages for monitoring student learning.

> If student behavior differs from what is predicted, the teacher can intervene while still concentrating on the students in the target group. (p. 5)

While serving as a successful adaptive strategy, grouping students by ability, Shavelson argued, directs the teacher's attention to the group and not the individual student. The individual distinctions and needs of pupils in

the classroom are masked as the group becomes the unit of instructional planning. The teacher may develop educational opportunities which are more appropriate for the group as a whole, but there is no certainty that they will meet the needs of most students within the group.

Additionally, ability grouping may encourage teachers to act in ways that limit student learning. Shavelson suggested that placement in a group may serve as a ceiling to teachers' judgments about student achievement. When a student's behavior is viewed within the context of his/her current group status, the teacher may be prevented from forming an accurate idea of present performance. Shavelson also warned that grouping by ability encourages use of traditional, time-honored instructional treatment for students of different ability levels. Through creating the illusion that individual students' needs are being met, ability grouping may impede experimentation with potentially more suitable instructional techniques by teachers.

Some critical research has also identified differentiation in the use of resources for students of different ability groups. A 1968 National Education Association opinion poll, for example, indicated that few teachers prefer to teach low-ability groups. The study also found that teachers were generally promoted from the lower groups, leaving the inexperienced or the disenfranchised teachers. Though critical research is lacking, this ghettoization of low-ability groups no doubt exerts

significant influences upon both teacher and student perceptions of classroom learning.

A battery of other studies has examined other aspects of the educational program of low-ability groups. Studies by Rist (1970) and Oakes (1985) found less time and attention given by teachers to those classified as less able. In a 1974 study, Heyns reported a disproportionate amount of time devoted to college-tracked students by guidance counselors. Rosenbaum (1976) also found better lab facilities and materials were devoted to college-prep students.

In sum, research upon the manner in which teachers alter school environments for ability groups contains several strong tendencies. Where teacher differentiation exists, the research suggests students in upper-tracks are provided special attention. Upper-track students regularly are taught by the most experienced teachers who use more innovative and stimulating instruction. Teachers and counselors devote more time and attention to these same students, and provide them with better physical facilities and class materials.

Other research, while identifying no overwhelming adaptations of instruction for ability groups, warned of the complex nature of meeting students' needs within grouped classrooms. One study argued that grouping limits the teacher's ability to meet the needs of students within the group; a second has outlined the extraordinary efforts

needed to assure success of students in ability grouped classes.

Taken as a whole, research findings on modifying curriculum for more appropriate learning in grouped classes are disheartening. The existence of grouping seems to encourage teachers to change their teaching in ways which are detrimental to large number of students and to adapt perspectives and procedures which fail to meet students' needs.

Teacher expectations in grouped classes

A great number of studies have lent strong support to the detrimental effects of grouping associated with slow learners. In attempting to explain these effects, scholars have produced a mass of research. One of the most provocative ideas to emerge from these studies to explain the negative influences of grouping has been what is often called "the self-fulfilling prophecy."

An early suggestion that student and teacher expectations might be responsible for discrepancies in achievement among students of similar measured ability appeared in Daniels' 1961 review. In analyzing both British and American studies of the effects of tracking, Daniels concluded that grouping

> ...artificially increases the range of educational attainment of junior school children, i.e., widens the gap between the "bright" and the "backward." (p. 70)

He proposed that this differentiation between tracked groups was a consequence of the treatments received by each group.

Specifically, the upper A-tracked students receive "A minded teachers and therefore A results"; the lower C classes "get C minded teachers, C educational aspirations and inevitably C results" (p. 70).

Daniels' assertion that teacher and student belief in the potential abilities of students was a major factor in student success was reinforced in 1964 by other English research. In a comprehensive study of ability and attainment in English primary schools, Douglas studied 491 children within the same school. Placed in ability groups since their eighth birthday, they were observed and tested for a period of three years. One result which emerged from the study was a sharp divergence of test scores between children of matched measured ability. Upper-track pupils performed predictably better than children of equal ability who had been placed in the lower track.

Perhaps the most influential research to emerge on the self-fulfilling prophecy was that of Rosenthal and Jacobson (1968). In their study of Oak School, a public elementary school of approximately 650 students, randomly selected students from a class were identified as "academic spurters." Teachers were informed that unusually great gains in achievement could be expected from these students. After a period of several months, these "spurters"--regardless of ability group placement--showed reliable gains in IQ scores. Teachers also rated those selected students from the high and middle groups more favorably in several

classroom characteristics, although students from the lowest group received no such ratings. Rosenthal and Jacobson concluded that this modification of the teachers' expectations of students positively affected student achievement both within the class and upon standardized measurements.

Though most studies have looked at the effects of grouping on low ability students, a 1977 study by Starkey and Klusendorf suggested that high ability grouped students might also be victims of labeling and teacher expectations. In their study of student attitudes towards tracking, they found many high-track students reported feeling excessive pressure and competition in their classes. These students seemed to express frustration because of their inability to perform well in relationship to other students in their classes.

Summary. In examining the research on teachers and ability grouping, serious questions emerge about the equality of educational experiences for ability-grouped students. Researchers have documented a series of disconcerting tendencies that point to inferior education for low-level classes. Teachers in low-ability classes seem to use uninspiring methods, have lower expectations for students, and make few adjustments for individual student needs. This research suggests that where ability grouping is an integral part of the educational environment, teachers act in ways detrimental to learning by all students.

Effective Teaching

Over the last century, teacher effectiveness has been one of the most researched areas of education. More than 10,000 published studies, and untold number of dissertations and master's theses, have been devoted to finding the "good" teacher (Dunkin and Biddle, 1974).

Early research focused upon characteristics of outstanding teachers. Much of this research examined personality factors which intuitively were assumed to be valuable attributes for good teachers. Other researchers attempted to establish statistically relationships between teacher characteristics and effectiveness. Such characteristics as intelligence, sex, marital status, and educational background--as well as teachers' eye color, voice quality, and strength of the teacher's grip--were investigated for their possible links to teacher effectiveness (Dunkin and Biddle, 1974; Cruickshank, 1986).

For a variety of reasons, this early research on teaching failed to produce important results. Relying largely upon rating scales to assess characteristics of teachers, researchers uncovered few strong correlations between pupil gains and other criteria. Rating scales, which often utilized vague and highly inferential criteria, produced little agreement among raters and proved unable to separate "good" teachers from others (Cruickshank, 1986).

Since 1960, researchers have been more successful in

finding useful information concerning teaching and the effectiveness of teachers. With the gradual abandonment of exploration into characteristics of teachers, the focus of research has been upon the actual processes of teaching as they occur in the classroom. This reorientation was encouraged by the development of models of research on teaching (Mitzel, 1960; Dunkin and Biddle, 1974). Mitzel proposed that research on teaching be classified into three categories: product, process, and presage. Product research focuses upon variables which directly affect student behavior. Process research includes an examination of student and teacher behaviors which might influence or affect product variables. Presage research is concerned with the characteristics of students or teachers which may bear upon process variables. Further refined by Dunkin and Biddle (1974), this model of teacher research suggests the complex nature of teaching. In addition, it clearly focused attention upon student learning as the goal of teaching and provided a framework for investigating and interrelating variables.

A further impetus toward examination of teacher-student interactions was the development of classroom observational instruments. No longer dependent upon rating scales and other more subjective tools, researchers began to examine methodically teachers' classroom behavior.

Among several researchers who developed instruments for classroom observation was Ned Flanders (Flanders, 1960).

One of the most frequently used classroom observation tools, the Flanders' instrument focused predominately upon teacher-student interaction. By categorizing and coding interactions, researchers were able to use this instrument to begin making comparisons of patterns of systematically observed teacher behavior to student gains (Cruickshank, 1986).

The emergence of observational instruments that could produce reliable information about classroom behaviors provided a valuable tool for the investigation of teaching. Throughout the 1960's and 1970's, investigators observed classrooms to examine a broad range of teacher-related variables.

One of the most influential reviews of this classroom research was carried out by Rosenshine and Furst (1971). In their review of fifty process-product studies, they examined the relationships of teacher behaviors to student achievement. They identified eleven teacher-behavior variables that seemed to be significantly related to student achievement. Of these eleven, five variables were particularly consistent in their effects on achievement. The three variables found to have the strongest correlations--clarity, variability, and enthusiasm--are relevant to the present investigation and are discussed below.

Teacher clarity

Seven studies that Rosenshine and Furst examined

reported significant results for the clarity of teachers' presentations. These measures of clarity were found to have significant correlations ranging from .37 to .71. The studies examined such things as clarity of teacher descriptions, appropriateness of cognitive level of materials, and teacher ability to explain concepts clearly. In addition, clarity of classroom organization was related to student achievement. Four studies had significant correlations of .34 to .67 for indicators related to organizational clarity. These studies looked at coherence, organization, and clarity of lessons and level of confusion in class.

These findings have been supported by more recent research. In a study of 28 third-grade teachers (Emmer et al., 1980; Evertson and Anderson, 1979), teachers who were more effective managers set clear classroom procedures, gave clear directions and presentations, and communicated more clearly in general. A 1980 study of beginning teachers (Emmer and Evertson, 1980) found effective teachers set clear expectations for behavior and had well-defined academic standards. Welisch and others (1978) also identified setting and maintaining academic standards as important behaviors for effective classroom management.

Teacher variability of instruction

Eight of the studies reviewed by Rosenshine and Furst examined the variety of activities and materials used in the classroom. These studies gathered information on several

indicators of variety including: the number of different instructional materials and teaching devices used, the variety of cognitive levels of class discourse, and student perceptions of teachers' procedural flexibility. In the studies in which they were calculated, correlations to student gains ranged from .24 to .54.

Teacher enthusiasm

Teacher enthusiasm was investigated in five additional studies. These studies used observer ratings, estimations of vigor and power of classroom presentations, and student ratings of teachers' involvement, excitement, and interest in their subjects to assess teacher enthusiasm. These indicators were found to be positively correlated to learning gains, with correlations ranging from .42 to .61.

A barrage of more recent research has reinforced these earlier findings. Brophy and Evertson (1976) found a positive relationship between enthusiasm and achievement in older students. Gage (1979) suggested that teacher enthusiasm was one of only two dimensions of teaching that seemed to make a difference in achievement or attitude at all grade levels and all subject matters and student types. In another 1979 report, Silvernail highlighted the influences of enthusiasm on students of all ages, especially older adolescents.

Time on instruction

Two additional classroom variables have emerged from

the literature as having important impact upon learning. Since the 1970's, an impressive array of research has identified instructional time as an important variable affecting student achievement. Jane Stalling and her colleagues at Stanford Research Institute have carried out extensive experimental studies in which significant variables obtained in correlational studies were tested in controlled situations. Using modified versions of the Flanders' interaction observation system, researchers have consistently found strong links between time on instruction and learning (Stallings and Kaskowitz, 1974; Stallings, 1979; Stallings, 1980; and Simons and Stallings, 1985). Other researchers (Anderson, Evertson, and Brophy, 1976; Fisher, et al., 1978; and Wyne and Stuck, 1979) found similar positive relationships between time students spent successfully engaged in academic tasks and student achievement and negative relationships to student off-task behavior.

Homework

Teachers' assigning of homework is another variable identified by researchers as importantly linked to student achievement. In a review of literature on homework, Walberg, Paschal, and Weinstein (1985) collected more than 400 articles written since 1900 on the topic. Until recently, however, little research examined effects of homework on learning (Strother, 1984). A 1977 study by Austin found a positive correlation between homework and

math achievement in grades four through ten. In a reanalysis of data from the High School and Beyond study, time spent on homework had a measurable impact on student grades (Page and Keith, 1981; Keith, 1982). These researchers also noted that low-ability students could achieve grades commensurate with more able students through increased time on homework. Further, the absence of assigned homework negatively affected student performance on achievement tests.

Perhaps the most startling findings on homework's positive influence were reported by Walberg, Paschal, and Weinstein (1985). In their synthesis of 15 homework studies, they noted that homework

> ...appears to raise, on average, the typical student at the 50th percentile to the 60th percentile. But when it is graded or commented upon, homework appears to raise learning from the 50th to the 79th percentile. (p. 76)

Graded homework, they point out, is among the strongest influence identified in educational research literature, producing an effect three times larger that social class.

Summary

Research on teacher effectiveness has made important strides from its early, intuitive stages to its present level of sophistication. With its focus on classroom processes, recent research has identified important aspects of the classroom environment that seem to contribute to productive student learning. Five classroom characteristics--teacher clarity, teacher variability of

instruction, teacher enthusiasm, time on instruction, and homework have been found to relate consistently to greater student achievement.

While researchers have looked at these classroom characteristics as part of expanding attempts to trace sound pedagogical practices, differences among classes on these important elements carry a special meaning within the context of this study. In classes grouped by some measure of presumed ability--classes where poor and minority students consistently are overrepresented; classes where students' achievement falls far below those of their peers; classes where students' self-image and confidence seems to deteriorate--such differences would provide a challenge to equal education.

C H A P T E R I I I

RESEARCH DESIGN AND PROCEDURES

This chapter outlines the instruments and procedures used to carry out the study. The sample for the study is detailed, the instruments used to collect data are explained, procedures used in the study are outlined, and the variables used for the study are discussed.

Sample Selection

Students and teachers from seven public high schools in Massachusetts representing diverse demographic characteristics participated in the research. The seven schools in the sample were selected to provide a range of students and schooling experiences from which to draw data. This diversity provided a broad base for viewing the processes occurring in classrooms.

The social and economic diversity of the school communities can be seen by examining data from the Massachusetts Kind of Community classification system (Massachusetts Department of Education, 1985). Under this system, towns and cities are classified into one of seven categories using fifteen socio-economic and demographic attributes that were identified as significant factors that differentiate communities from one another. The fifteen variables measure the economic base of the community and demographic characteristics of its population, including

race, age, language usage, and income levels.

The seven communities which the schools served fell into four categories within the KOC scheme (Table 1). Four schools were located in communities classified as urbanized centers--densely populated and culturally diverse manufacturing and commercial centers. One school served an Economically-Developed Suburb area--a suburb with high levels of economic activity, social complexity, and high income levels. Another school was located in a Growth Community--a town experiencing rapid economic and population expansion. The seventh school was located in a community classified as Resort/Retirement/Artistic--a community with high property values and relatively low income levels.

TABLE 1

KIND OF COMMUNITY CLASSIFICATION (KOC)
OF THE SEVEN SAMPLED SCHOOLS

School	KOC Classification
School 1	Urbanized Center
School 2	Economically-Developed Suburb
School 3	Growth Community
School 4	Urbanized Center
School 5	Resort/Retirement/Artistic Community
School 6	Urbanized Center
School 7	Urbanized Center

A wide variation in per pupil expenditures was also present among the sample of schools. The average integrated cost per pupil varied from $2,362 for the lowest school to $3,824 for the highest (Table 2). One school district's average expenditure was in the top ten percent for districts in the state; another fell within the bottom five percent for per pupil district expenditures. Five of the districts in which the participating schools were located spent less than the state-wide average of $3,143 per student; three of these five schools, in fact, were in the bottom third of all districts. The top-spending two schools in the sample, on the other hand, spent substantially more than the state-wide average.

TABLE 2

AVERAGE INTEGRATED OPERATING COST PER PUPIL (1984-85) OF THE SEVEN SCHOOLS PARTICIPATING IN STUDY

School	Operating Costs per Pupil (in Dollars)
School 1	2,362
School 2	3,025
School 3	3,050
School 4	3,682
School 5	3,824
School 6	2,750
School 7	2,750
State average	3,143

Source: Bureau of Data Collection, Department of Education, Individual School Report, October 1, 1985 (Boston: Massachusetts, 1986).

Schools having minority populations were also represented in the sample. Two schools from a large urban area had minority populations of over six percent. Four additional schools had minority populations of three to four percent, while the minority students in the seventh school school made up about one percent of the total population (Table 3). The overall minority student population of the state is fourteen percent.

TABLE 3

MINORITY STUDENT POPULATION
OF THE SEVEN SCHOOLS PARTICIPATING IN STUDY

School	Minority School Population (in Percent)
School 1	3
School 2	3
School 3	1
School 4	4
School 5	4
School 6	6
School 7	6
State average	14

Source: Bureau of Data Collection, Department of Education, Individual School Report, October 1, 1985 (Boston: Massachusetts, 1986).

In each school three classes were selected for data collection. United States history classes were chosen as especially appropriate for this study, as all students were required to take this course. This decision thus allowed the sample to be drawn from a pool of classes representing

the whole range of students in the schools. Though the original intent of the researcher was to gather data from a triad of one low, one middle, and one high class for each of the seven schools, such a sample was obtained from only five of the schools. In one school, class scheduling necessitated observations of two high-level classes and one middle-level class. In the seventh school, where students were grouped by ability only in advanced placement history classes, two non-grouped classes and one advanced placement class were chosen.

In all, three-hundred and thirty students and twenty-one teachers in low-, middle-, and high-ability grouped classrooms provided data for the study (Table 4). Data were collected from sixty-one students in five classes identified as low-level; one hundred and twenty-three students in six classes identified as middle-level; one hundred and twenty students in eight classes identified as high-level; and twenty-six students in two classes identified as heterogeneously-grouped.

Instrumentation

Four instruments were used to collect data from classrooms, students, and teachers: the Five Minute Interaction (FMI), the Classroom Snapshot, the Student Classroom Climate Questionnaire, and the Teacher Classroom Climate Questionnaire.

TABLE 4

DISTRIBUTION OF STUDENTS AMONG SCHOOLS AND ABILITY-GROUPED CLASSES

School	low ability	average ability	high ability	total
School 1	16	14	19	49
School 2	18	17	14	49
School 3	12	28	7	47
School 4	8	22	20	50
School 5	-(a)	-(a)	14(a)	40(a)
School 6	-(b)	21	38(b)	59
School 7	7	21	8	36
Total	61	123	120	330(c)

(a) Two classes were labeled "heterogeneously-grouped" by the principal and department head. All three classes were excluded from later analysis.

(b) Because of scheduling difficulties, data were collected from two high-ability classes and one average-ability class in this school.

(c) Includes all classes from which data were collected. Data from 296 students in six schools--School 1, School 2, School 3, School 4, School 6, and School 7--were used in later analysis.

The two observational instruments, the Five Minute Interaction and the Classroom Snapshot, were originally developed by the Stanford Research Institute. They have been used successfully in a wide range of studies, including the National Follow-Through Evaluation (Stallings, 1975) and the National Day Care Study. More recently, the instruments were used to collect data in 38 elementary and secondary schools for A Study of Schooling, directed by John Goodlad. For the Goodlad study, the instruments were modified to simplify coding procedures and increase relevancy for

secondary classrooms use (Giesen and Sirotnik, 1979).

The Five Minute Interaction focuses upon verbal or nonverbal interactions which occur in the classroom. During a recording period of five minutes, each interaction made by or directed to the teacher in class is coded by the observer. The instrument consists of a series of 70 frames with five response categories. Each interaction is coded within the five frames to identify the speaker (Who), person spoken to (To Whom), content of the remark (What), instructional relevancy (Context), and any major affective elements accompanying the interaction (How) (see Appendix A). At the beginning and end of the set of frames are matrices for marking the beginning and ending times of the observations. By identifying the five component parts of the interaction, the observer can map, in shorthand form, the key elements of student-teacher interactions in the classroom.

The Classroom Snapshot (Appendix B) provides data about the nature of on-going classroom activities. Using the seventeen configuration categories of the instrument, the observer "freezes" a particular moment of the class and records what each adult and student are doing, the size of groups of students, and the nature of class activities in which members are involved. The instrument thus allows a representative description of existing classroom activities, including low-involvement in instructional activities and off-task behavior, to be easily made.

The Student Classroom Climate Questionnaire was modeled upon a similar instrument used in Goodlad's Study of Schooling (Appendix C). The survey was designed by the researcher to collect student perceptions of content and instructional practices relevant to the study in each classroom. The forty-item student questionnaire was administered to all students in the twenty-one classes to record information about students' perceptions of important elements of their classrooms. The questionnaire sought this information in several different ways. Students expressed agreement on a Likert-type scale to thirty-six statements about the class, teacher, or learning. The questionnaire also solicited information about use of class time, materials, and methods. Two additional questions sought information about time spent on learning in the classroom and at home. Students were also asked to indicate whether each item on a list of materials had been used as part of the history class. Similarly, students indicated the teacher's use of a variety of learning activities.

The Teacher Classroom Climate Questionnaire, also modeled after a similar questionnaire used in A Study of Schooling, was utilized to gather information from classroom instructors about their classrooms (see Appendix D). In the five-item survey, teachers were asked to evaluate use of time for learning in the classroom and at home. They also indicated the extent to which each item in a list of materials and learning activities was used in their class.

Additionally, teachers were asked to supply information about the objectives or goals of the course by listing the five most critical things which they wanted the students to learn from the class that year.

Procedures

Sample selection

Primary consideration for inclusion in the study was the existence of ability-tracked classes in U. S. history at the school. In initial telephone interviews, three schools from the twelve originally considered for participation, reported no tracking in their schools. Of those remaining, seven schools were selected to reflect diversity on several characteristics: mean income level for families in the community, school size, proximity to a major population center, per pupil expenditure, and per cent of minority school population (see Appendix E).

In five of the seven schools chosen for the study, interviews were conducted with the head teacher of the social studies department using the General Information Interview (see Appendix F). In the two remaining schools, the same form was used with the principal. Information about grouping practices, including student placement procedures, teaching assignment procedures, and curricular content differentiation among levels, was solicited in the interview. The teachers or principal were also asked to

identify the three classes chosen as "high-ability," "average-ability," or "low-ability."

As previously noted, one school at this point was identified as grouping students along predominately heterogeneous lines. Though data were collected by class observations and student and teacher questionnaires, these data were not thereafter used in the study. In a second school, class scheduling prevented the observation of a low-ability class, and a second high-ability class was observed instead.

Data gathering

The four instruments used to collect data were field-tested on two separate occasions at a high school not included in the study. Minor modifications, as suggested by the field-testing observations, were made in the coding procedures. All instruments were again field-tested at another high school. Suggestions made by teachers and students who participated in the field-testing were incorporated into the final version of the instruments to insure clarity of directions and items.

During the first visit to each classroom, the Five Minute Interaction and the Classroom Snapshot were each used four times. These observations were made in four ten-minute pairs. At the start of each observation pair, the five-minute recording period of the FMI was followed by a two-minute wait. Codings were then made using the Classroom Snapshot. After this one-minute recording, the final two

minutes were used for preparation for the start of the next ten-minute observation pair. To compensate for the unequal length of classes in different schools, the forty-minute block needed for the four pairs of observations was placed equidistant between the beginning and end of each class. This procedure sought to avoid over-emphasis upon the time near the beginning or end of class and to allow for similar data to be collected on student and teacher behaviors. All three classroom observations in each school were made on the same day to provide further consistency to the data.

During the second classroom visit, all students and teachers in the selected classroom completed classroom environment questionnaires. Teachers were told that the researcher would supervise the class during administration of the questionnaire. It was suggested that the teacher use this time to fill out the teacher questionnaire. In nineteen of the classes, the teacher was not present in the classroom during the administration of the questionnaire. In two classes, both low-ability, the teacher chose to remain in the classroom.

Variables

In addressing the research objectives, this study examined five classroom characteristics that were identified in the literature as aspects of effective instruction. Data from three sources--classroom observations, students'

perceptions, and teachers' perceptions--were used to examine these important aspects of the classroom experience. For these five characteristics, nineteen variables were selected to determine whether students in different ability-grouped classes experienced different instructional methods and content.

Instructional methods variables

Eleven variables measured aspects of instructional methods used by teachers to transmit course content. Four of these variables were related to the organizational and verbal clarity of the teacher. Six were measures of the variety of materials and methods used in the classroom. An additional three variables were used to examine the variety of instructional materials utilized by teachers. The final variable was a measure of the teacher's enthusiasm in class.

Teacher clarity. Four variables measured students' perceptions of the clarity of teachers' oral instructions and classroom organization. The ability of the teacher to communicate clearly was gauged from students' responses to four questionnaire items. These items tapped student perceptions of the verbal clarity of teacher directions and other verbal interactions with students. Student responses were used to calculate a value representing overall class perceptions of the teacher's ability to communicate clearly.

Data about the organizational clarity of the classroom environment were also drawn from the student questionnaire. Students were ask to express their agreement with eleven

statements about the organization of the classroom. These responses were used to calculate a value that was used as an indicator of the students' perceptions of the organization clarity of the learning environment.

Two additional items on the questionnaire served as indicators of teacher clarity. Student perceptions of the teacher's ability to outline clearly the instructional purpose of activities in class and student perceptions of the clearness of the rules and regulations in the classroom were both used as further measures of teacher clarity.

Teacher variability. Six variables representing the variety of materials and instructional techniques used for instruction by teachers in their classrooms drew upon teacher and student questionnaire responses and observational data.

Teachers were asked to indicate how frequently they used each of ten different instructional materials. Using teacher responses to all ten items, a value representing the variety of materials used in each class was calculated.

Student perceptions of the variety of materials used in the classroom were tapped using a similar procedure. On the student questionnaire, students were asked to indicate whether the ten instructional materials had been used in their class. A class score representing another measure of the variety of materials used in the class was then calculated based upon student responses to these items.

Information about classroom use of supplemental

materials was also drawn from data collected using one of the classroom observational instruments. As part of the data collected by the Five Minute Interaction (FMI), each occurrence of teacher or student use of materials other than textbooks was recorded. The percentage of observed interactions in which materials were used served as an additional measure of supplemental instruction materials in class.

A second aspect of teacher variability--the variety of instructional activities utilized in class--was also measured using teacher perceptions, student perceptions, and classroom observations. Teachers were asked to indicate whether students had participated in each of sixteen instructional activities as part of the history class. As with the item on instructional material, a class value using the teacher's responses was calculated to represent the variety of instructional activities used in the classroom.

Students were asked to response to a similar item on the student questionnaire. A class score representing student perceptions of the variety of instructional activities used in the class was calculated from student responses to the sixteen activities.

Data about instructional activities was also taken from the Snapshot observational instrument used in classroom observations. The number of different activities recorded during the observation periods was used as an indicator of the variety of learning activities for each class.

Teacher enthusiasm. This variable represents students' perceptions of how much teachers seem to enjoy teaching their classes. On the Student Classroom Climate Questionnaire students were asked to express their agreement with three statements concerning the teacher's satisfaction with teaching. As with previous scales, a class value was calculated using student responses as an indicator of the teacher's enthusiasm.

Curricular content variables

Eight of the variables represented the quantities and types of knowledge available to students. Five of these were measures of time on instruction. The remaining three indicators related to the nature of the content of instruction in class.

Time on instruction. Five variables represented the relative amount of time spent by students on instruction or learning activities. Responses to items from the Student Classroom Climate Questionnaire and the Teacher Classroom Climate Questionnaire and data from the Classroom Snapshot and the Five-Minute Interaction provided various measures of this important classroom characteristics.

As part of the questionnaire administered to all teachers in the selected classrooms, teachers indicated the percentage of class time spent on daily routines, instruction, and getting the class to behave. The percentage of time which the teacher reported as devoted to instruction was used as one measure of time on task.

Data on instructional time was collected in a similar manner from students. In responding to one item on the student questionnaire, students were asked to indicate which of three types of classroom activities--daily routines, learning, and getting students to behave--used the most, next most, and least amount of class time. Students' responses for learning were averaged and served as an indicator of students' perceptions of instructional time for each class.

A third indicator of time on instruction was drawn from data collected during classroom observations. As part of the Five Minute Interaction, the content of each teacher-student interaction was classified as instructional, routine, behavioral, or social. The percentage of all recorded interactions which were labeled instructional was used as an additional measure of time on instruction.

A fourth indicator of instructional time was drawn from both the student and teacher questionnaires. Teachers were asked how much time they expected their students to spend on homework each day. Students were asked to indicate how much time they actually spent on homework per day. An average of the responses of all students in the class was calculated and the resulting amount averaged with the response of the teacher to obtain an class index of time spent on homework.

Data collected using the Classroom Snapshot observational instrument were used for a fifth measure of time on instruction. The number of students observed not

involved in instruction-related activities during recording periods served as an inverse measurement of classroom instructional time.

Curricular goals. Three additional instructional content variables related to class goals were also examined. As part of the Teacher Classroom Climate Questionnaire, teachers were asked to list the five most critical things that they wanted the students to learn in their history class for that year. Using a simplified version of Benjamin Bloom's taxonomy of educational objectives, three curriculum experts were asked separately to examine these goals and place them within one of the six categories relating to the level of cognitive skills required for the activity or goal (Bloom, et al., 1956). To encourage the greatest possible agreement, each specialist was asked to read a narrative review of the the taxonomy and examples of goals or activities which were representative of each level as part of the classification process (see Appendix G). Where disagreement on the classification of a specific goal occurred, the goal was placed in the category in which two of the three specialists had classified it. By assigning numerical values to each cognitive level, the average cognitive level of listed goals for each class was then calculated.

If goals fell into the Affective Domain of Bloom's taxonomy, the specialists were also asked to indicate this. The percentage of total class goals classified as affective

by the specialists also served as a measure of the content of each class.

Finally, goals which seemed unable to be classified were categorized as unclear by the reviewers. The percentage of total class goals that were identified as unclear was used as an additional indicator of the content of classes.

Analysis

Several statistical techniques were utilized to examine differences among the ability grouped classes on the variables selected for study. Initially univariant measures were used to provide a broad picture of the differences among the classes. Because of the desire to identify the manner in which variables worked together to differentiate the groups of classes, multivariant statistical techniques were also used.

Discriminant analysis, a type of multivariate analysis, was chosen as the primary statistical method for examining differences among the ability-grouped classes on the variables selected for study (Klecka, 1975). By mathematically combining linear combinations of the variables, differences among groups were identified and variables within the functions which contributed most to the differentiation were located. Increased clarity was obtained by analyzing separately those variables measuring

curricular content and those measuring instructional methods. Finally, discriminant classification techniques were utilized to substantiate previous analysis of the data.

Data for this study were collected from three sources--students, teachers, and classroom observations. While these data in many instances could be seen to represent individuals, the focus remained throughout the study on differences in classes. To maintain the classroom as the unit of measure data were aggregated to provide class means where necessary.

C H A P T E R I V

FINDINGS

The findings of the study are presented in this chapter. In the first part of the chapter, the results of the preliminary univariant and multivariant analyses are examined. Findings from discriminant analysis, the major statistical technique utilized in the study, are outlined in the second section. These findings are organized around the two research questions that guided this study, with a discussion of the findings for the curricular content variables followed by the findings for instructional methods variables.

Initial Analysis

The nineteen independent variables were examined to determined whether students in different ability-grouped classes experienced different content and instructional methods. These variables were identified in the literature as having a strong relationship to student learning in classrooms.

Scale reliability

Seven of the variables were represented by combined responses to three or more items on student or teacher questionnaires (see Appendix H). This grouping of responses to similar items, or scales, provided a broad base for measuring these variables. The variable representing

organizational clarity, for example, was based upon student responses to eleven statements about similar aspects of the classroom environment that were related to teacher classroom organizational clarity. Similarly, scales for teacher verbal clarity and teacher enthusiasm were calculated from student responses to several items centering upon these concepts.

Two additional variables were the number of classroom materials that teachers or students indicated were used from a list of possible educational materials. In a similar manner, two measures of the variety of instructional activities were represented by the number of activities from a list of possible classroom activities that teachers or students identified as having been used.

As the purpose of this study was to identify any differences in teaching methods or material among ability groups, these scales were examined to improve their usefulness in differentiating among the groups. Items to which responses by teachers or students within different groups were identical or items for which responses fell into no perceivable pattern were deleted. In this manner, the reliability of the scales--and their ability to identify differences among the groups--was increased (see Appendix I). Thus, for example, the reliability of teachers' perceptions of the variety of classroom materials used was increased with the removal of the item asking about use of computers in class, to which all eighteen teachers responded

in the same manner. Where scale items were removed, scale scores were recalculated with the smaller set of items.

Univariant analysis

As an initial step in the analysis, the manner in which the nineteen variables differed among the three levels of ability-grouped classes was examined. Table 5 lists the variables and their corresponding ratios of variability (f-value) (see Appendix J for group and class means and standard deviations). Among the nineteen variables, the data suggest that only two are substantially different for the three groups of ability-classes. The combined student-teacher measure of time spent on homework differs the most among the groups (f=4.22 with a significance of .04). The number of students observed not involved in instructional activities during class observations also differs among the three groups (f=2.80 with a significance of .09).

Five other variables have an f-value above 1.0. As Table 5 indicates, observed time on instruction, number of teacher-listed affective goals, one measure of teacher clarity, student-identified variety of classroom activities, and teacher-identified variety of activities differ among the classes in noticeable ways.

TABLE 5

UNIVARIANT F-RATIOS AND TEST OF SIGNIFICANCE FOR ALL VARIABLES

Variable	F	Significance
Time on instruction (student)	.85	.48
Time on instruction (teacher)	.72	.51
Time on instruction (observed)	1.03	.38
Homework	4.22	.04
Students not involved	2.80	.09
Cognitive level of goals	.92	.42
Affective goals	2.18	.15
Unclear goals	.39	.69
Verbal clarity (student)	.03	.97
Organizational clarity (student)	.70	.51
What may be done in class (student)	.13	.88
Teacher tells what to learn (student)	1.18	.33
Variety of activities (student)	1.80	.20
Variety of activities (teacher)	.25	.78
Variety of activities (observed)	1.35	.29
Variety of materials (student)	.04	.97
Variety of materials (teacher)	.60	.56
Variety of materials (observed)	.03	.97
Teacher enthusiasm (student)	.13	.88

Two and fifteen degreeds of freedom

Multivariant analysis

While examination of differences suggested by individual variables provides some understanding of curricular and instructional processes within the classrooms that were studied, a broader picture can be obtained by looking at the combined differences measured by the variables of content and instruction. By considering the variables simultaneously, important information about their relationships can be observed (SPSS Incorporated, 1986).

Differences among the three groups on the combined

nineteen variables is reported in Table 6. When the three groups are examined on all of the nineteen combined variables simultaneously, no clear differences among the groups appear. This is reflected in the f-value and its corresponding significance level.

TABLE 6

MULTIVARIATE F-RATIO AND TEST OF SIGNIFICANCE FOR COMBINED NINETEEN VARIABLES

F-value	Significance
.007	.74

S=2, M=6, N=-1/2

A more enlightening view is obtained when content and instructional variables are analyzed separately. In looking at the eight content variables, important differences begin to emerge. As can be seen in Table 7, the combined differences measured by the content variables, represented by the f-value and its corresponding level of significance, is noteworthy. Differences measured by the variables produce an approximate f-value of 2.02, significant at the .085 level.

As a group, the eleven variables of instructional methods represent a small and statistically insignificant difference among the three levels of classes in instructional methods. In Table 8, the f-value, a

calculation of differences represented by the eleven variables, and its corresponding significance level suggest no important differences among these groups on these variables (approximate F=.58 with a significance of .86).

TABLE 7

MULTIVARIATE F-RATIO AND TEST OF SIGNIFICANCE FOR EIGHT CONTENT VARIABLES

F Value	Significance
2.02	.085

S=2, M=2 1/2, N=3

TABLE 8

MULTIVARIATE F-RATIO AND TEST OF SIGNIFICANCE FOR INSTRUCTIONAL METHODS VARIABLES

F value	Significance
.59	.86

S=2, M=4, N=1 1/2

Discriminant Analysis

Discriminant analysis, a multivariate statistical technique, was chosen to explore these differences identified by this initial analysis among the three groups

of classes (dependent variable) on the independent content and instructional methods variables. The procedure creates functions by mathematically weighing and combining linear combinations of the variables to differentiate among the groups as much as possible. After the derivation of the functions, this technique further allows the researcher to study and explain differences among two or more groups with respect to several variables simultaneously (Klecka, 1980).

Curricular content

To determine differences in curricular content among the three groups of classes, discriminant analysis of the eight curricular content variables was carried out. Student, teacher, and observer reports on class time spent on instruction; combined student and teacher reports of time on homework; the number of students engaged in non-instructional activities; the cognitive level of course goals; the number of affective course goals; and the number of unclear course goals were considered in the analysis of curricular differences.

Using the Discriminant subroutine of the Statistical Package for the Social Sciences (SPSS), Version 9.0, NOS, these eight variables were mathematically combined to form functions to separate the three groups of classes (Nie, et al., 1975). Step-wise entry of variables was used in the analysis. This procedure selects the most useful variables one at a time to create an optimal set of discriminating variables. The variable that best discriminates is selected

first. A second variable is chosen that contributes in combination with the first variable to the greatest overall separation of the groups. The third and subsequent variables are selected to increase this separation until all remaining variables are selected or those remaining do not contribute sufficiently to justify their inclusion.

The number of functions that can be derived is limited to one less than the number of groups. As three groups were being analyzed, two discriminant functions were possible. Initially, as indicated in Table 9, the analysis identified significant differences in curricular content among the three levels. The first function accounts for most of the variance (87.93) measured by the eight variables; the second function discriminants among the remaining, yet important (12.07), percentage of variance.

TABLE 9

TEST OF SIGNIFICANCE FOR DISCRIMINANT ANALYSIS FOR CONTENT DEPENDENT VARIABLES

Function	Variance per cent	Canonical correlation	Wilk's lambda	Chi-square	df	Significance
1	87.93	.87	.17	23.09	10	.01
2	12.07	.55	.70	4.65	4	.33

The canonical correlations express the relative ability of each function to separate the groups. A value of zero would represent no relationship at all, while increasingly

larger values to a maximum of one indicate greater degrees of relatedness. The first function, with a canonical correlation of .87, has a very powerful ability to discriminant among the three groups. This is also indicated by the value for Wilk's lambda (.17), the chi-square equivalency (23.09), and the corresponding level of significance (.01).

The second function, while obviously less powerful than the first, seems to contain important information about differences among the three groups. In accounting for slightly over twelve percent of the differences among the groups, this function has a moderately strong canonical correlation (.55), though by itself, with a Wilk's lambda of .70, and a corresponding chi-square of 4.65, it has a low level of significance (.33).

In mathematically forming the functions, coefficients or weights for each variable were calculated to maximize the separation of the groups. By multiplying these raw or unstandardized coefficients by the class scores on each discriminant variable and adding a constant, an overall score for each class was arrived at. The group centeroids or average scores on the discriminant function for each group were then calculated by averaging the class scores within each group. This can be thought of as the most typical location of a case from that group in the space defined by the function (Klecka, 1975).

While the unstandardized coefficients represent the

absolute contribution of each variable to the function, they may be misleading when variables have different standard deviations. For purposes of interpretation, therefore, the raw scores were converted to standardized scores. These values represent the relative importance of variables within the function, thus allowing a determination of variables' contribution to the function score.

In Table 10, the standardized canonical discriminant coefficients for the variables and the group centeroids are listed for each function. Note that there are coefficients for only five of the eight variables. The remaining three variables, though eligible for selection, failed to make a contribution to the function at the selected level of significance and were not selected.

The group centeroids indicate that high-ability classes scored higher on the first function (1.54) than either average-ability classes (.24) or low-ability classes (-2.45). Further, high and low classes are most distinctly separated by the function. The average class centeroid falls between the high and low groups--and very near to zero, the overall means for all classes. To understand what this score represents, one should look, at least initially, to the standard coefficients. The larger the magnitude of a variable's coefficient, either positive or negative, the greater the variable's contribution to the function. Homework, with a coefficient of 1.52, makes the greatest contribution to the function. Observed time on instruction

(-1.11) also makes an important contribution. The three remaining variables (teacher-reported time on instruction, percentage of unclear goals, and the percentage of students not involved in instructional activities) contribute progressively less to the function.

TABLE 10

STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS AND GROUP CENTEROIDS FOR CONTENT VARIABLES

Variables	Coefficients	
	Function 1	Function 2
Time on instruction (teacher)	- .75	.31
Time on instruction (observed)	-1.11	.04
Homework	1.52	-.12
Students not involved	.33	.90
Unclear goals	.53	.30
Discriminant Functions Evaluated at Group Means (Group Centeroids)		
High Group	1.54	-.49
Average Group	.24	.84
Low Group	-2.45	-.33

The direction of the contribution, represented by the sign for each coefficient, is also an important element of the differences. In general, one would expect those groups with relatively large, positive centeroids on the function to have large scores on the positive variables that play a

major role in the function and low scores on negative variables that are central to the function. Inversely, groups with large negative group centeroids would most likely have small scores on those variables contributing in a strongly positive way to the function and large scores on variables making important negative contributions (Klecka, 1980).

Although the standardized coefficients are a general guide to differences among groups, they are of limited usefulness for interpreting discriminant functions. Both Huberty (1975) and Klecka (1980) have traced this weakness to the manner in which the function is calculated. The step-wise procedure used to enter variables into the function selects variables on their ability to add to the discriminating power of those variables already selected. Where variables are correlated, that is, where they share some degree of common information, selection is based not upon the variable's individual ability to discriminate among groups, but on its ability to discriminate beyond what is already represented by previously selected variables. Variables that might be important discriminators but are intercorrelated with other variables previously entered in the equation may be passed by for entry because their unique contributions are not as great as those of other variables (Klecka, 1980).

An additional set of statistics, the within-group structure correlations, serve to highlight any variables

that may have been ignored by the analysis. These coefficients represent the degree to which each variable individually is related to the discriminant function. Table 11 lists the within-group structure coefficients for both content functions.

TABLE 11

POOLED WITHIN-GROUPS CORRELATIONS BETWEEN CANONICAL DISCRIMINANT FUNCTIONS AND CONTENT VARIABLES (WITHIN-GROUP STRUCTURE COEFFICIENTS)

Variables	Coefficients	
	Function 1	Function 2
Time on instruction (student)	-.02	-.65
Time on instruction (teacher)	-.15	.23
Time on instruction (observed)	-.19	-.25
Homework	.40	-.36
Students not involved	.09	.90
Cognitive levels of goals	.06	.08
Affective goals	-.45	-.40
Unclear goals	.07	.29

In comparing the structure coefficients with the standardized function coefficients (Table 10) for the first function, one major difference is immediately apparent. The three variables with the highest standardized coefficients--homework (1.52), observed time on instruction (-1.11), and teacher-reported time on instruction (-.75)--also have strong to moderate correlations with the function. The variable most highly associated with the function, the percentage of affective goals (-.45), however, was not among

the five variables entered into the discriminant function. This discrepancy requires further examination if the meaning of the function is be understood.

While intercorrelation of variables makes interpretation of the discriminating functions more problematic, there are statistical clues that allow informed deductions about the functions to be made. Where two variables are highly correlated, they share their common contribution to the function. The contribution of positively correlated variables is often represented by the entry into the function of one of the variables, whose standardized coefficient incorporates the dominant discriminating power of both variables. The remaining discriminating power, reflected by the standardized coefficient of the second variable, is generally small or even in the opposite direction of that of the first variable. Where two variables are negatively correlated, they may both enter the function with high discriminant coefficients, though in opposite directions of each other. These coefficient values overstate the importance to the function of both variables, for within the function, they act to partially canceling out one another. Their actual contribution to the function is the combined effect of the negative and positive coefficients (Klecka, 1980).

An examination of the relationships among the variables themselves (Table 12) reveals interactions among the variables that might distort their true discriminating

power. Each correlation coefficient is an estimate of the strength of the relationship between corresponding pairs of variables. Two perfectly correlated variables would have a coefficient of 1.0; totally uncorrelated variables would be indicated by a coefficient of zero.

TABLE 12

POOLED WITHIN-GROUPS CORRELATION MATRIX FOR FIRST FUNCTION

Variables	Time on Inst. (St.)	Time on Inst. (Tch.)	Time on Inst. (Obs.)	Homework	Non-Involv.	Cogn. Level of Goals	Affect. Goals	Unclear Goals
TOI (ST)	1.00	.07	-.03	.21	-.65	-.28	.26	-.20
TOI (TCH)		1.00	.02	.40	-.06	.38	.23	.07
TOI (OBS)			1.00	.59	-.33	-.26	-.11	.27
HOMEWORK				1.00	-.41	.10	-.03	-.06
NON-INVOLV					1.00	.05	-.37	-.06
COGN. LEVEL						1.00	.08	-.20
AFFECT. GOALS							1.00	-.43
UNCLEAR GOALS								1.00

Several intercorrelations raise questions about possible interaction among variables. The failure of the variable representing affective goals, for example, to enter into the discriminant function is related to its intercorrelations with other variables. This variables is strongly negatively correlated with both the percentage of unclear goals (-.43) and the percentage of students not involved (-.37). As suggested by the structure coefficients, neither of these two variables is importantly associated with the function (.07 and .09, respectively), although both have moderately strong standardized

coefficients (.53 and .33). These two variables are probably representing the large discriminating power of the affective goals variable within the function, and not their own, much smaller contributions.

Further examination of the correlation matrix leads to additional clarification. The two variables with the highest standardized coefficients, homework (1.52) and observed time on instruction (-1.11), are very highly correlated (.59). Their standardized coefficients, however, are in opposite directions. As they share a large, common discriminating ability, they work in opposite directions, in effect partially canceling each other out. The role of the student involvement variable also begins to become clearer. While its standardized coefficient of 1.11 would suggest that it plays an important role in the function, its structure coefficient is only moderate in size (-.15), affirming that its importance is in part the result of the interactions of the two variables.

In sum, the first function outlines important differences that exist among the groups. Further, these differences are most pronounced between high- and low-ability classes. High and low classes differ most sharply on time reported spent on homework, with high classes reporting greater amounts of time and low classes reporting the least. Interpretation of the function also indicates greater emphasis upon affective course goals in low-ability classes. Finally, despite initial indications that observed

time on instruction represented an important difference among classes, closer examination suggests that its importance is only moderate.

While the first discriminant function is calculated so that the group means are as distinct as possible, other functions--up to a maximum of one less than the number of groups--may exist which also can represent the relationship among the three groups. In discriminant analysis, the coefficients for the second function also maximize the differences among the group centeroids with, however, the additional condition that the values on the function are not correlated to the first function. Resultingly, this additional function often emphasizes a second dimension of the differences among the groups that could not emerge because of the strength of the differences highlighted in the first function.

The standardized coefficients and group centeroids for the second function are also reported in Table 10. The group centeroids, or average group scores, suggests that this function, unlike the first function, separates most effectively average-ability classes (with a group centeroid of .84) from both high- (-.49) and low-ability classes (-.33). Among the standardized coefficients, the strongest contributor is the number of students not involved in academic tasks, with a standard coefficient of .90. Less important, making a contribution a third as strong as the first, are teacher-reported time on instruction and the

percentage of unclear goals. Homework and observed time on instruction, the variables with the two highest standardized coefficients in the first function, make only a modest contribution to the second function.

As in the first function, a great deal of interaction seems to be occurring among the variables. The structure coefficients, representing the relationship of each variable to the function, (Table 11) provide insight into this interaction. The variable with the strongest relationship to the function is the percentage of students not involved in instructional activities. As noted before, this variable also has the highest canonical coefficient for the function, as well. The variable showing the second largest association to the function is student-reported time on instruction with a strongly negative correlation of -.65. Its additional contribution to the discriminant equation beyond previously entered variables, however, was not sufficient for inclusion in the analysis. Similarly, the third most strongly associated variable, the percentage of affective goals (-.40), did not play a role in the calculation of the discriminant function. As they both, however, are strongly associated with the function, the differences among groups that they measure must be represented by other variables.

As Table 12 suggests, student-reported time on instruction is strongly negatively correlated with students non-involvement in instructional activities (-.65). Though time on instruction did not enter into the discriminant

equation, its important discriminating ability is probably represented in part by the large discriminant coefficient of student involvement (.90). While the exact nature of the interaction is less clear, the discriminant coefficients for the percentage of unclear goals (.30) and, to a lesser extent, student non-involvement (.90) may also represent the percentage of affective goals, to which they are moderately correlated (-.43 and -.37 respectively). Teacher-reported time on instruction appears to be an important element of the discriminant function, with a discriminant coefficient of .31. Table 12, however, suggests that the variable is only weakly related to the function (.23), and can probably be ignored. As in the first function, interaction between homework and this variable, may be inflating both their discriminant coefficients, as they are moderately correlated (.39)

The second function, then, identifies differences in curricular content that set apart average-ability classes from both high- and low-ability classes. Most notably, average-ability classes are marked by a higher degree of non-involvement by students in classroom academic activities. Similarly, reported time on instruction seems to differ among average and low and high classes, as well. Average-ability students view themselves as spending less time on academic tasks than their high- and low-ability counterparts.

The previous analyses identified differences among the

groups on variables for each function. Two additional tools will be used to provide a clearer picture of the differences among the groups and answer the research questions guiding this study. First, the derived functions for the content variables are graphed. These visual representations allow a more accurate characterization of the groups. Second, the discriminating functions are used to classify the eighteen classes into the ability-group that they most resemble. The success of the functions in correctly identifying classes serves as yet another indicator of the reliability of the functions in identifying differences among the classes.

In examining the two functions that were derived from the content variables, the structure coefficients, which represent the relatedness of each variable to the function, were used to identify those variables that determined the essential discriminating power of the function. Where one or a small set of variables have substantially larger structure coefficients than the remaining variables, these variables control the function. If the dominant variables are measuring a similar characteristic, the function can be seen as representing that characteristic (Klecka, 1980).

As indicated in Table 11, the number of affective class goals cited by teachers and reported time spent on homework are most strongly associated with the first function. The variable affective goals is negatively correlated with the function. Large values for this variable would contribute to negative class function scores. As noted in the previous

chapter, the variable is represented by the percentage of class goals listed by teachers that were judged to be in the affective domain (See Appendix K for a list of goals). Nearly twenty percent of these teacher goals were concerned with affective behaviors. Some of the goals attended to broad humanitarian ends, such as "appreciation of the value of humanities" or "want to become involved citizens." Many others, however, were behavior-related, for example "develop a sense of responsibility", "respect for others", or "ability to work in a group." All of these goals are in contrast with more traditionally academic goals, such as "a basic knowledge of our past", "ability to think critically", or "develop an understanding of the racial and ethnic diversity of our country."

Homework, which also makes a strong contribution to the discriminating function, is positively correlated. Positive class function scores, therefore, would be expected with classes having large values on this variable. This variable is represented by the combination of the average time students reported spending on homework for the class and teachers' expectations of time needed to complete class homework.

As suggested by the structure coefficients, the remaining variables are only weakly related to the function and contribute little to its understanding. Differences among the three groups of classes that are identified by the first function should be attributed to the two most-strongly

correlated variables, affective (non-academic) goals and homework. Taken together, these two variables--and therefore the function--can be considered to represent differences among the classes in academic orientation.

For the second function, two variables--observed student non-involvement and student reported time spent on instruction--dominate the function. As student non-involvement is positively correlated to the function, classes with high values on this variable would likely have positive class function scores. This variable is represented by the percentage of students who were observed not to be involved in academic activities in the classroom. The second most-strongly associated variable, reported time on instruction, is negatively correlated with the function. High class scores on this variable would contribute to negative class function scores. This variable is a measure of student-reported classtime spent on instruction. As these two variables seem to measure similar characteristics, the second function can be thought to represent student non-involvement.

This discussion now allows a meaningful interpretation of the graphing of the two functions. The separation of the groups is seen in Figure 1. The centeroid for each of the three groups is plotted using the average group score on each of the two functions. The space defined by the functions has been divided into quadrants. The centeroid for average-ability classes (indicated by the number 2) is

in quadrant one. Classes located in this quadrant have greater than average non-involvement of students and greater academic orientation. None of the three groups is located in quadrant two, which represents low academic orientation and low involvement. The group centeroid for low-ability classes (number 3) is in quadrant three. This quadrant represents low academic orientation and high student involvement. The high-ability class mean (number 1) is in quadrant four. Classes in this quadrant are marked by greater than average student involvement and greater academic orientation.

The ability of each function to separate groups is apparent, as well, in viewing the graph. The first function, academic orientation, most effectively separates high-ability classes from low-ability classes. The group centeroid for high-ability classes is located to the right of the axis representing the total class mean. The mean for low-ability classes is well to the left or negative side of the axis. The group mean for average-ability classes lies between the two other groups, very near the overall average for all classes. The second function is effective at discriminating between average-ability classes and low- and high-ability classes. The mean for average-ability classes falls well above the axis for this function. Both high- and low-ability class centeroids are located below the axis.

Individual class scores on both functions can also be graphically represented. In Figure 2, the class scores on

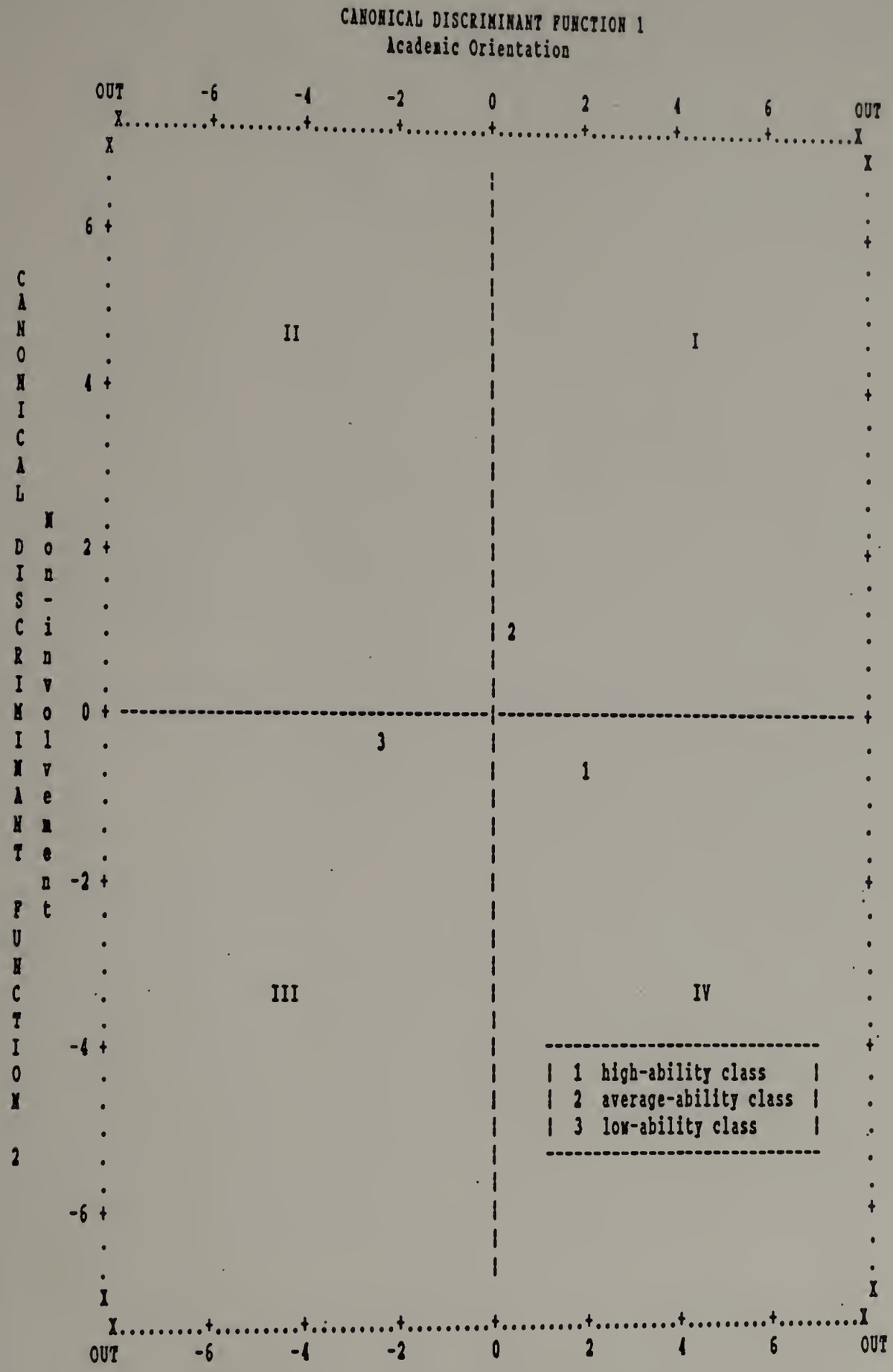


FIGURE 1 PLOT OF GROUP CENTEROIDS ON CANONICAL DISCRIMINANT FUNCTIONS FOR CURRICULAR CONTENT VARIABLES.

the first and second functions are used to plot all eighteen classes. High-ability classes are indicated by ones, average-ability classes by twos, and low-ability classes by threes. As the graph suggests, class scores vary widely, with overlap among the groups. Scores for average-ability classes, in particular, differ substantially on both the first function, academic orientation, and the second function, student non-involvement. High-ability classes also vary considerably, though their scores on the first function are much more stable than on the second function. Low-ability classes, however, are closely clustered, showing little variation on either of the functions.

While discriminant analysis is useful for analyzing differences among groups, it is also a powerful classification technique. Using the values for each case on the discriminating functions, the most likely group membership of each case can be calculated by comparing the scores to each of the group centeroids. This technique is often used as a predictive device when the group membership is unknown, such as predicting likely voter behavior on the basis of key attitudes and background, or assigning individuals to jobs based on personality and skill factors (Klecka, 1980).

Classification can also be used, however, to test the power of the discriminating functions. After classifying each case using scores on the discriminating functions, the predicted group memberships are compared to actual group

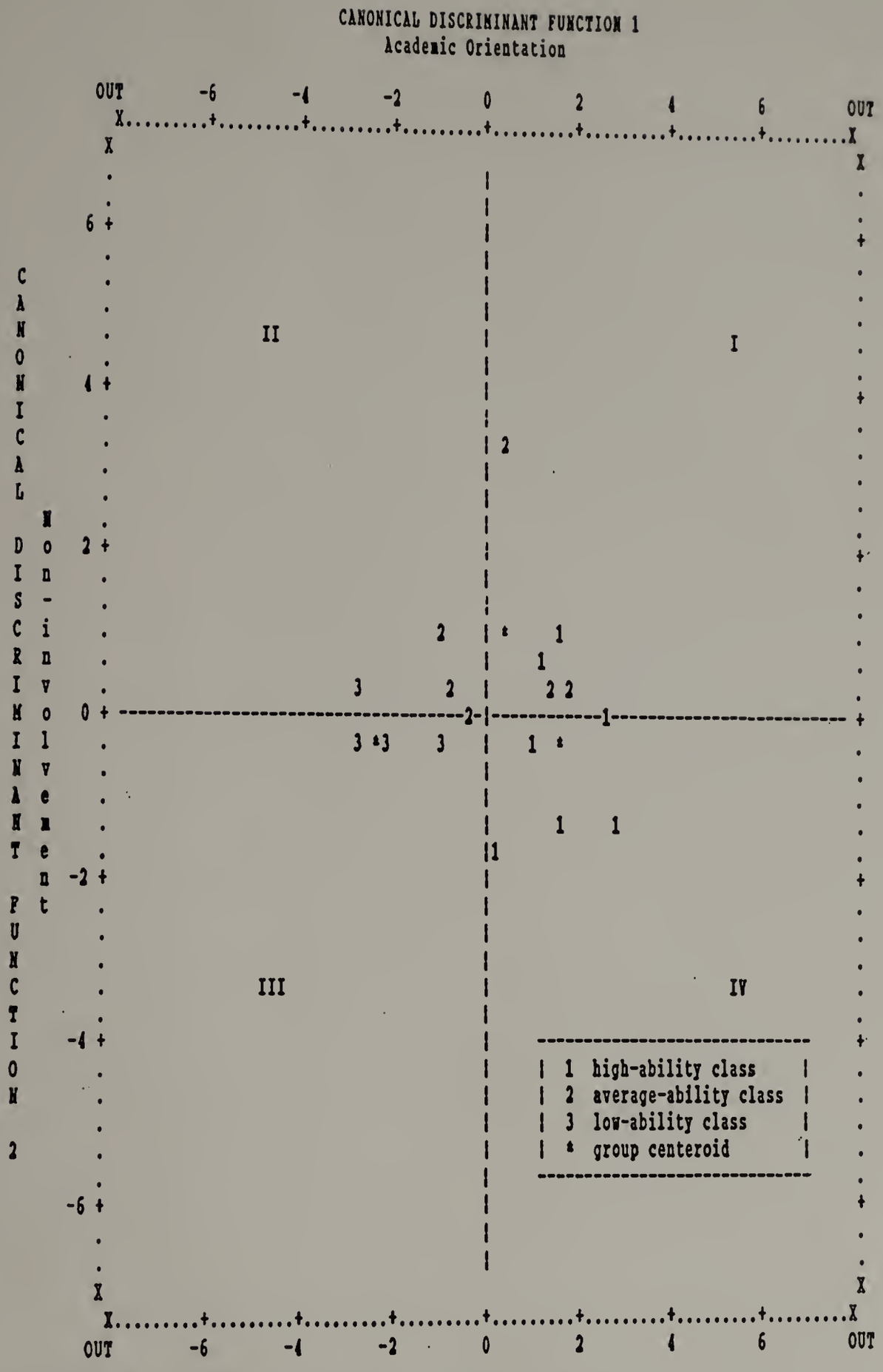


FIGURE 2 PLOT OF CLASS SCORES ON CANONICAL DISCRIMINANT FUNCTIONS FOR CURRICULAR CONTENT VARIABLE.

membership. The percentage of cases correctly classified can be seen as an indicator of the functions ability to discriminate among groups.

Table 13 lists the results of the classification phase of the analysis. Overall, eighty-three percent of the cases were correctly classified into their actual groups. As there are three groups of nearly equal size, prior probability of a class being correctly classified is roughly one third. Correct classification beyond one third can be attributed to the ability of the the discriminant functions to separate the groups.

As the table indicates, classification of low-ability and high-ability classes was most accurate. Only one of the seven high classes was misclassified. For low-ability classes, all five were correctly identified. Inaccurate classifications occurred most frequently among average-ability groups, where one-third of the classes were misclassified. Interestingly, no high classes were misclassified as low, nor low classes as high.

The results of the classification phase of the analysis reinforce the previous statistical indicators that suggested the strength of the derived functions. The high percentage of correctly classified classes highlights the significance of the variables within the functions and their effectiveness in discriminating among classes in the three tracks. It is also evident from the classification that high-ability classes are most distinct from low-ability

classes. Average-ability classes, which were more often misclassified, seem to differ most markedly from one another and are less easily characterized.

TABLE 13

CLASSIFICATION BY DISCRIMINANT ANALYSIS
ON CONTENT DEPENDENT VARIABLES

Actual Group	N of Classes	Predicted Group Membership		
		High	Average	Low
High Track	7	6	1	0
		85.7%	14.3%	0.0%
Average Track	6	2	4	0
		33.3%	66.7%	0.0%
Low Track	5	0	0	5
		0.0%	0.0%	100.0%

Percentage of Classes Correctly Classified: 83.33

In attempting to answer the first research question, then, the analysis of the eight content variables did indeed indicated significant differences among the three levels of ability-grouped classes. These differences suggest that classes within each ability level have characteristics on these content variables that set them apart from classes in other groups. The three groups of classes were found to differ most markedly on four content-related variables. Further analysis suggested that these variables can be seen as representing two important concepts, academic orientation of the class and student involvement. High-ability classes

were likely to have high student involvement and a strong academic orientation. While average classes tended to have a moderate academic orientation, they were characterized by an especially low level of student involvement. Low-ability classes were marked by a high level of student involvement in academic tasks, but very low overall academic orientation.

Instructional methods

While the multivariant analysis of the eleven instructional methods variables (Table 8) indicated no large differences on these combined measurements among the three groups of classes ($f=.59$ with a significance of .86), the analysis was continued to explore differences that might not have emerged from the MANOVA analysis (Huberty, 1975).

As with the content variables, discriminant analysis was chosen to examine differences among the groups on the instructional methods variables. As previously discussed, the initial step of the analysis consists of mathematically combining the variables into a discriminating function. Variables enter the function through a step-wise procedure where the variable that best discriminates among groups is selected first. Additional variables are then chosen one at a time for their ability to separate groups in combination with the previously entered variables. This selection continues until all variables are selected, or none of the remaining variables can improve the discriminating ability

of the function.

During the calculation of the discriminating function for the instructional methods variables, the procedure was halted after the entry of the first variable. None of the remaining ten variables added sufficient discriminating power to the function to justify entry. The discriminating function, therefore, consists of only one variable, student-reported variety of instructional activities. Table 14 suggests that the function, or variable in this case, discriminates moderately among the three groups. As only one function was calculated, it of course accounts for one hundred percent of the variance identified. The canonical correlation (.44), representing the function's ability to discriminate among the groups, is moderate. This is also indicated by the value for Wilk's lambda (.81), chi-square (3.22), and the corresponding level of significance (.20).

Examination of the group centeroids in Table 15 suggests that the function discriminates best between high- (.55) and low-ability classes (-.46). Average ability classes lie between these extremes (-.26), although they resemble more closely low classes on the characteristic represented by the function.

As only one variable entered the function, that variable is contributing to the entire discrimination of the function. Its standardized discriminant coefficient is of course 1.00, as it is the sole contributor to the function. The structure coefficients, which represent the relationship

of each variables to the function, provide little useful information. Table 16 lists the structure coefficients

TABLE 14

TEST OF SIGNIFICANCE FOR DISCRIMINANT ANALYSIS FOR INSTRUCTIONAL METHODS DEPENDENT VARIABLES (FIRST AND ONLY FUNCTION)

Percent of variance	Canonical correlation	Wilk's lambda	Chi-square	df	Significance
100.0	.44	.81	3.22	2	.20

TABLE 15

GROUP CENTEROIDS FOR INSTRUCTIONAL VARIABLES

Discriminant Functions Evaluated at Group Means (Group Centeroids)	
High Group	.55
Average Group	-.26
Low Group	-.46

for the variables. Once again, the variable, student-reported activities, is perfectly correlated with the function. The remaining coefficients, in effect, represent the correlations of each variable to the one variable in the function, student-reported activities. Put slightly differently, the structure coefficients are identical to the within-groups correlations for student-reported activities, and therefore provide no information about variable

interaction for interpreting the function.

TABLE 16

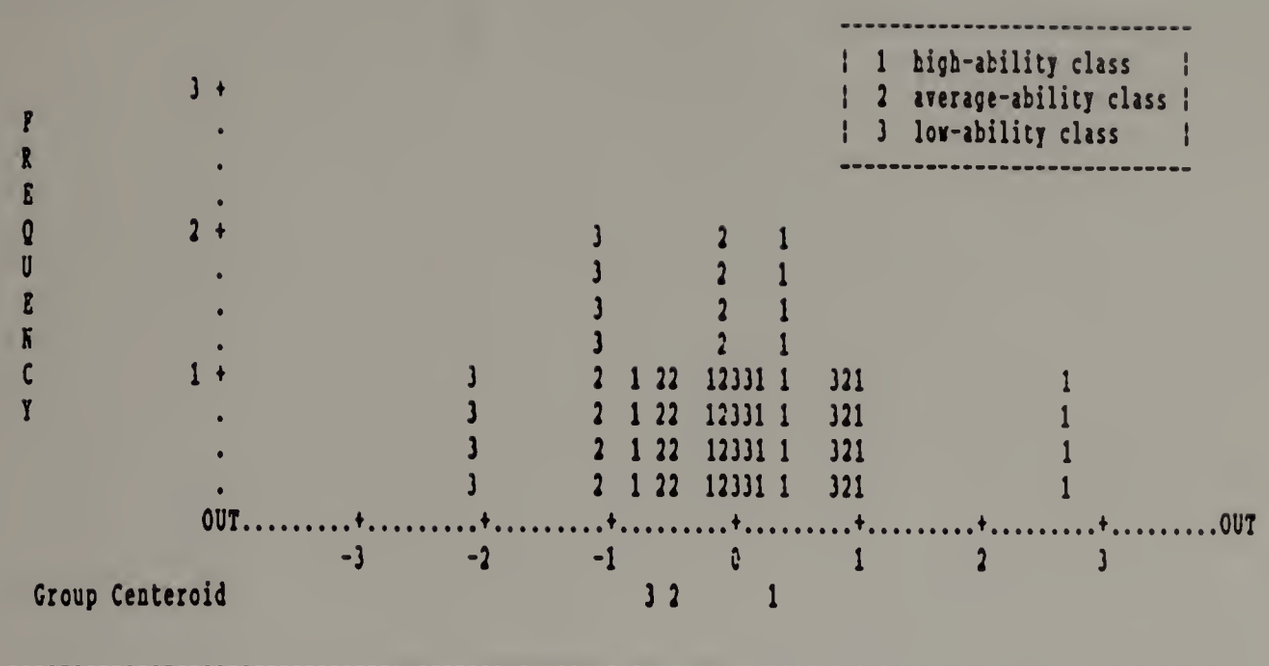
POOLED WITHIN-GROUPS CORRELATIONS BETWEEN CANONICAL DISCRIMINANT FUNCTIONS AND INSTRUCTIONAL VARIABLES (WITHIN-GROUP STRUCTURE COEFFICIENTS)

Variables	Coefficients
Verbal clarity (student)	-.20
Organizational clarity (student)	.18
What may be done in class (student)	.30
Teacher tells what to learn (student)	-.31
Variety of activities (student)	1.00
Variety of activities (teacher)	-.23
Variety of activities (observed)	-.48
Variety of materials (student)	.07
Variety of materials (teacher)	-.01
Variety of materials (observed)	-.42
Teacher enthusiams (student)	.04

Figure 3 is a graphic representation of the group separation of the function. Discriminant class scores are calculated by multiplying the unstandardized discriminant coefficient for the single variable in the function by each class's score on the variable. As only one function was derived, this first and only function represents all the variance found among the groups. The eighteen class scores are, therefore, plotted as a one-dimensional graph or continuum that represents the discriminant function. For purposes of comparison, each group, along with its group centeroid, is plotted separately.

As the graph indicates, there is a great deal of overlap among the classes in the three groups. While the

ALL CLASSES



HIGH-ABILITY CLASSES

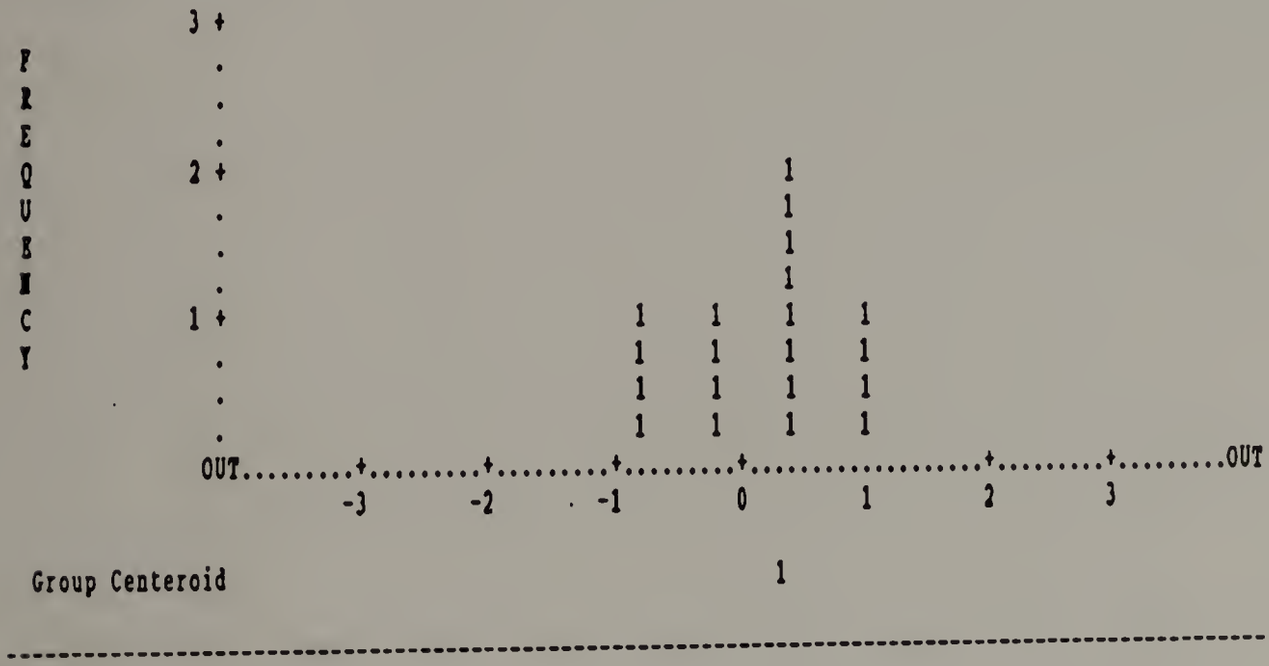
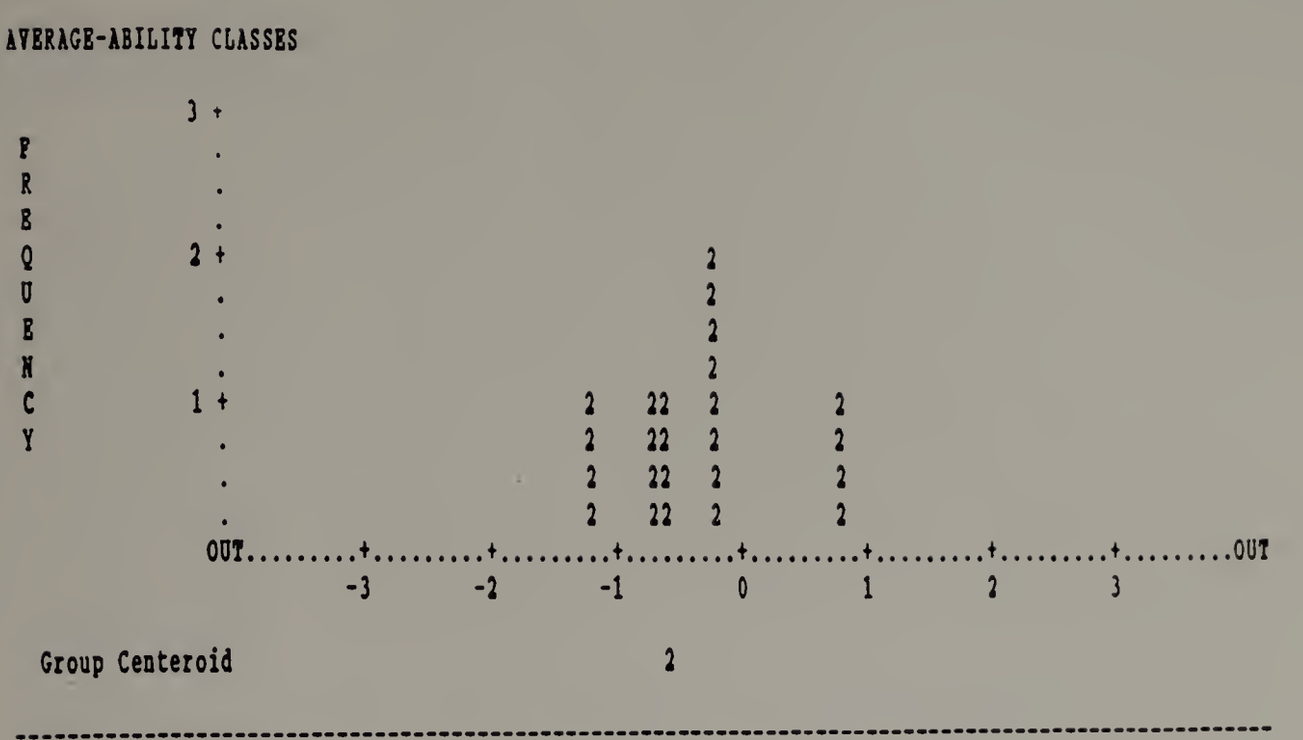


FIGURE 3 GRAPHS SHOWING DISTRIBUTION OF CLASS SCORES ON CANONICAL DISCRIMINANT FUNCTION FOR INSTRUCTIONAL METHODS VARIABLE.

Figure 3 continued



group centeroids are clearly separated by the function, classes within the groups, especially the high- and low-ability groups fall within a wide band on the continuum.

The classification phase of the analysis renders similar results. When class scores on the function are used to predict the probable group membership of each class, slightly over sixty percent of the classes are correctly classified (Table 17). High- (71%) and average-ability classes (83%) were most accurately classified. The function, however, is of little use in classifying low-ability classes. A mere twenty percent of these classes were correctly placed in their actual group. Further examination of those classes that were misclassified highlights the inability of the function to distinguish low-ability groups. Although no high or average classes were incorrectly identified as low, three low classes were misclassified as high, and one as average. In sum, though

TABLE 17

CLASSIFICATION BY DISCRIMINANT ANALYSIS ON INSTRUCTIONAL METHODS DEPENDENT VARIABLES

Actual Group	N of Classes	Predicted Group Membership		
		High	Average	Low
High Track	7	5 71.4%	2 28.6%	0 0.0%
Average Track	6	1 16.7%	5 83.3%	0 0.0%
Low Track	5	3 60.0%	1 20.0%	1 20.0%

Percentage of classes correctly classified: 61.11

overall classification was nearly twice as high as would be expected by chance, the classification phase of the analysis reaffirms the weak nature of the function in separating groups.

In answering the second research question, then, only small differences were found among the three groups of classes on the eleven instructional methods variables. While students in high-ability classes reported a greater variety of instructional activities than students in average- or low-ability classes, this difference was only moderately strong and was a weak predictor of group membership. On most of the instructional variables in the analysis, classes among all three groups were very similar.

C H A P T E R V

SUMMARY AND CONCLUSIONS

Summary of the Study

The purpose of this study was to examine differences in instructional content and practices in ability-grouped classrooms. Students and teachers in twenty-one secondary United States history classes in seven schools in western Massachusetts participated in the study. Of the original twenty-one classes, only eighteen were found to be grouped by ability, and were used in later analysis. Data were collected from two hundred and ninety students and eighteen teachers from seven classes identified as high-ability, six classes identified as average-ability, and five identified as low-ability.

Two research questions guided the study. The first question examined the extent to which the content differed among levels of ability-grouped U. S. history classes. The second research question centered upon the extent to which instructional methods used by teachers differed among levels of ability-grouped U. S. history classes.

Four instruments were utilized to collect data for the study. During classroom observations of each class, two observation instruments, the Five Minute Interaction and the Classroom Snapshot, were used to obtain information on student-teacher interaction and classroom processes. Data about student perceptions of content and instructional

practices were also collected from all attending students in the eighteen classes through a forty-item Student Classroom Climate Questionnaire, developed for the study from a similar instrument used in Goodlad's Study of Schooling. Information about class content and instruction was collected from teachers using a five-item Teacher Classroom Climate Questionnaire.

Data from the eighteen classes were examined on nineteen variables representing five classroom characteristics identified in the literature as aspects of effective instruction. Eight of the variables represented the types and quantities of knowledge offered to students. Eleven of the variables were aspects of instructional methods used to transmit course content.

A variety of statistical techniques were used to answer the research questions. Initial univariant analysis of the nineteen variables was followed by multivariant techniques to identify important differences among the groups on the variables. Discriminant analysis, a multivariant technique, served as the primary tool in the analysis.

Major Findings

The major findings for the two research questions that guided this study are reported separately in this section. Further, additional commonalities found among all classes in the study are discussed.

Research question 1: To what degree does curricular content differ across ability grouping levels in high school United States history classes?

Important differences among the three ability groups were found in the variables representing curricular content. Univariant analysis indicated that four of the eight content-related variables differed substantially among the three ability groups. Two content variables, time spent on homework and non-involvement of students in instructional activities, showed especially strong differences among the groups.

Discriminant analysis, which allowed the simultaneous consideration of the eight variables, further indicated that combinations of variables differed importantly among the group. Two functions or unique combinations of variables were calculated to separate most effectively the three groups of classes. Several statistics related to the variables and their interactions with one another were used to identify the variables that determined the essential discriminating power of each function. Each function was named after the common characteristics which these dominant variables measured.

The two functions identified two dimensions that distinguished levels of ability-grouped classes from one another. The first function, academic orientation, discriminated most clearly between high- and low-ability classes. High classes had the highest level of academic orientation, while low classes had the lowest. Average-

ability classes fell between high and low classes, very close to the overall means. The second function, student non-involvement in instructional activities, separated average-ability classes from both high and low classes. Average classes were distinguished from low and high classes by a considerable greater amount of student non-involvement.

In sum, high-ability classes were characterized by high academic orientation and low levels of student non-involvement. Average-ability classes tended towards moderate academic orientation and high student non-involvement. Low-ability classes as a group had low academic orientation and low levels of student non-involvement.

Research question 2: To what degree do instructional practices differ across ability grouping levels in high school United States history classes?

Only small differences were found among instructional practices across the three ability levels. Initial univariant analysis indicated that classes differed weakly on three instructional variables, observed use of supplemental materials, one measure of teacher clarity, and student-identified variety of classroom activities.

Discriminant analysis, which considered the differences on groups of variables simultaneously among the levels, also identified only weak differences among ability levels on the instructional variables. The discriminating power of just one of the eleven variables was sufficiently strong enough

to enter into the function before the procedure was halted. This variable, student-reported variety of instructional activities, differentiated weakly among the ability levels. This function separated most effectively high- and low-ability classes. High classes as a group had greater instructional variety than either average-ability or low-ability classes.

Similarities

In answering the two research questions that guided this study, analysis centered upon identifying differences in curricular content and instructional methods that existed among classes of different ability groups. While these differences in important aspects of the classroom environment shed light on the varying educational experiences of students within ability-grouped classes, the data also indicated that the classes examined in this study were in many ways extremely similar. This finding is consistent with what other studies have pointed out: that classrooms in the United States are remarkably alike (Boyer 1983; Goodlad 1984; Oakes, 1985; Sizer 1984).

Most striking were similarities in the physical environment of the classrooms that participated in the study. Students were organized into self-contained classrooms, predominately of one grade level, sitting in separated, individual seats, all facing a common chalkboard. Almost all of the observed classes contained straight rows with narrow aisles separating them, occasional maps, and

bulletin boards--usually empty or covered with school office memos.

Much of what went on in the U.S. history classes also followed a common pattern. A narrow range of instructional activities using a limited number of materials marked the classrooms (see Appendix L and Appendix M for summaries of teacher and student questionnaires). By far the most common activity in history classes was listening to the teacher talk. Every teacher and over ninety percent of the students reported this as a dominant characteristic of the class. An almost equal number indicated that class discussions were a frequent activity. Although lively exchanges of ideas and opinions would seem to be an important aspect of any social studies class, classroom observations revealed that these "discussions" rarely involved active interchange; instead, teachers tended to seek specific answers to factual questions. While teachers spoke for seventy percent of the time, less than five percent of teachers' interactions with students were open-ended in nature.

From teacher and student responses, other activities can be identified as occurring frequently in all ability groups. Writing answers to questions and taking tests or quizzes were common occurrences in class. Somewhat surprisingly, reading the textbook in class also seemed to be a frequent activity, though students noted this more often than teachers.

Several activities occurred on an occasional basis in

classes. Making charts, graphs, or maps, listening to outside speakers, or having a debate were reported to happen from time to time in the U.S. History class in the six schools. Other activities were mentioned less frequently. Students seldom wrote reports for class, and even less often listened to fellow students giving reports. Students also stated that they rarely went on field trips, built or drew things, or acted out ideas or historical happenings. Further, making recordings or films was an infrequent activity for history students in any ability group.

Given the limited range of activities, it is not surprising to find that U.S. history students as a group were exposed to a limited number of materials during their studies. Over eighty percent of teachers reported that textbooks were used often or always, while nearly sixty percent of these teachers said other books were rarely used in class. Worksheets also appeared to be commonly used by history teachers, with over ninety percent of teachers citing them as at least occasionally used. Yet, materials other than textbooks or worksheets were rarely utilized; they were recorded in use only eight percent of the time during classroom observations. History teachers seemed to make little use of learning kits, games or simulations, and tape recordings or records. Also infrequent was the use of television or computers. Despite prophecies of widespread electronic learning, technology seems to have been slow to move into the social studies classrooms in this study.

From the data in this study, it would be fair to characterize the eighteen classes as predictably passive, teacher-directed environments. With rare diversions, students sat quietly, listened, occasionally answered questions, or read.

Implications

A review of the rationale for grouping students by ability for instruction helps to place the findings within a broader context of schooling. As was discussed in Chapter II, ability grouping is based upon several explicit assumptions about the learning process. Students are seen to differ greatly in skills and knowledge that are assumed to be critical for classroom learning. These broad differences, it is argued, necessitate adaptations of educational experiences to meet students' needs. The adaptations that would be needed for a randomly-grouped class of students, however, are often so broad that they can not easily be provided within one classroom. Classes must be constituted, the argument continues, so that students with similar characteristics are in classes together. Such "ability grouping," supporters propose, allows both the classroom content and instructional methods to reflect the needs of the students.

In classrooms examined in this study, there was little indication that teachers were adapting the educational

environment to meet student needs. Where differences among ability-grouped classes were identified, they indicated that classrooms characterized as low- or average-ability were less academically oriented and students were less involved. The failure of ability grouping to meet student academic needs was further suggested by the striking similarities found among classes of all levels. Based upon the variables examined in the study, teachers seemed to teach in very similar ways using nearly identical methods and materials, regardless of the perceived ability level of the group being taught. These findings, then, fail to support the major pedagogical rationale for ability grouping--curricular and instructional adaptation. If, as in the sampled schools, high-ability classes are taught essentially the same material with the same techniques as their low-and average-ability counterparts, the pedagogical necessity for dividing students into "ability groups" must be called into question.

These broad curricular similarities echo the findings of other studies that have looked at classroom life in schools (Boyer, 1983; Goodlad, 1981; Sizer, 1984). They also support the voluminous and important body of research that has failed to identify consistent academic benefits for any group of students. Only in classes where teachers carefully adapted materials and methodologies to students within the classes have any predictable academic gains been documented (Stallings, 1979; Froman, 1981). The present study, then, suggests that the contradictory academic effects on students

seen across studies of ability grouping may result from variables unrelated to group placement.

Within this context, the overwhelming body of literature documenting the negative social and attitudinal effects of ability grouping on students in low-ability classes assumes even greater importance. While providing little or no academic benefits to any students, ability grouping seems to have negative effects on the social and affective growth of students in lower-level classes. Given the barrage of research correlating placement in low-ability groups to minority and low socio-economic status, sorting students into separate instructional environments--where some of these environments have clearly detrimental outcomes on student growth--takes on insidiously racist and classist overtones. With poor and minority students disproportionately represented in low-ability classes, ability grouping may be seen to perpetuate a two-tier educational system. In one group, "high-ability students," predominately white and middle-class, experience preferential educational environments, organized to heighten academic learning and foster positive attitudes towards school and self. In the second tier, "low-ability students," often economically-disadvantaged or from racial or linguistic minorities, are exposed to classroom environments where academic skills and expertise have less importance and negative social and personal attitudes are reinforced.

Recommendations

The findings from this study point to several important directions for educational improvement within both public schools and university settings. While these recommendations have emerged from the data collected in the sampled schools, they may also provide insights for concerned professionals who are grappling with the difficult issues surrounding ability grouping in other learning environments. Educators must, of course, view these conclusions cautiously and examine their own settings for directions for educational improvement.

Recommendations for public school educators

Educators must continue to examine critically the research on ability grouping as a base for making informed curricular decisions. Careful exploration of the existing curriculum and its academic and affective effects on students in individual schools is strongly recommended. Data about the academic success of students from all ability levels should be used in assessing the effectiveness of grouping. Further, attentive analysis of grouping's influences on students social and affective development must be made. Administrators, in informal settings and organized inservice efforts, can play a positive role in creating an environment in which such explorations are nurtured and valued.

Also, exploration and experimentation with alternative

grouping procedures within the classroom and school should be encouraged. With mounting evidence that ability grouping does not engender high achievement for all students and may have harmful affective effects on low- and middle-ability students, administrators should assist teachers in implementing instructional alternatives for grouping students.

Given the limited range of educational activities and materials found within the classrooms in this study, teachers should strive to develop a broader repertoire of instructional techniques. In addition, they should attempt to utilize a more diverse range of materials within and outside of the classroom. Once again, administrators can provide individual as well as staff-wide opportunities for teachers to broaden the range of instructional tools and apply them to their own classrooms.

In the classrooms examined in this study, few teachers utilized skills that would seem to be needed for successful teaching of mixed-ability groups. It is clear that the implementation of organizational and instructional alternatives to ability grouping will demand dramatic changes in teacher behaviors. For alternative grouping constellations to take hold, teachers must have opportunities to refine and develop additional skills to meet the demands of diverse student needs within classrooms. The following are topics in which teachers may need to develop greater expertise: assessment of individual student

needs; refinement of instructional goals and objectives to guide instruction; identification of student learning styles; adaptation and development of learning opportunities that allow students to learn material at their appropriate rate and using various styles and modes; promotion of learning environments that emphasize cooperation among students. Administrators must recognize the support and assistance that teachers will need in developing these skills and classroom routines to make the difficult transition from traditional instructional groupings to more responsive alternative grouping forms.

Recommendations for institutions of higher education

Institutions that prepare teachers must also recognize their responsibilities towards the creation of classroom conditions that are responsive to the needs of all students. The overwhelming support of teachers for ability grouping (Wilson and Schmits, 1978) raises questions about the role university programs play in instilling acceptance of ability grouping in students preparing to be teachers. A careful reassessment of teacher preparation programs could focus upon assuring prospective teachers opportunities to develop skills and expertise that would prepare them for teaching within a variety of grouping situations. An expanded range of teaching techniques, firmly grounding in identification of student differences, refined abilities to adapt instruction to accommodate learners' needs, and an understanding of school change are needed by teachers

entering the profession to respond to the demands of mixed-ability teaching. The reliance upon textbooks found in this and other studies (EPIE Institute, 1977; Goodlad, 1984) also points to weak curriculum development skills that must play an integral part of teacher preparation if alternative grouping strategies are to be pursued. Further, schools of education must reaffirm their commitment to assist teachers presently within schools who may lack necessary skills for teaching mixed-ability groups.

One creative approach to addressing both of these common concerns has been the development of partnerships among schools and universities (see Sinclair and Ghory, 1987; Sinclair and Harrison, in press; Trimble and Sinclair, 1987). Working together with a commitment to collaboration and equality among partners, these partnerships bring to bear the resources and experiences of both institutions on persistent educational problems. Concerned educators may wish to draw upon the lessons and successes such partnerships have had in exploring the challenges of developing effective grouping practices that assure equal learning for all students (see Trimble, Putnam, and Sinclair, 1988).

Suggestions for Further Research

Several possibilities for further research emerge from this study. Four of these are briefly discussed.

1. The data from this and other studies suggest that

ability grouping in social studies takes many forms. Further cross-site studies of how students are presently being grouped is needed. In depth studies that explore how grouping is inacted within individual school settings are also needed. Such explorations of attitudes, assumptions, and effects of grouping on all members of the school environment would assist educators in creating more effective classroom and school environments that enhance effective instruction and increased student learning.

2. With its complex and politically charged nature, ability grouping provides an interesting focus for examining curricular decision-making in schools. Case studies documenting interactions surrounding policy decisions about ability grouping and student placement might uncover enlightening insights into school administration and change.

3. Investigators should continue efforts to identify effective instructional techniques for teaching students within mixed-ability classes. Further, the identification of skills and competencies needed by teachers to apply these techniques successfully in the classroom within a variety of settings would greatly aid school-based reformers and institutions of higher education in preparing meaningful, change-oriented teacher education curriculum.

4. Investigations into the perplexing problem of the persistence of grouping, despite a long history of research that fails to document student academic gains, would greatly enhance efforts to change educational environments to meet

student needs. A crucial element of any such investigation would be the documentation of attitudes of teachers, administrators, students, and parents toward ability grouping.

In examining the educational practices in ability groups, few adaptations of curricular content or instructional methods for the students were uncovered. Though supporters claim ability grouping permits teachers to change the educational environment to meet the learning needs of the students, little evidence emerged to suggest that average- and low-ability students were benefitting from his organization. Students in low- and middle-ability classes spent less time learning, were taught lower-level skills and knowledge, and were exposed to fewer types of instructional materials. Where differences in content and instruction among classes were identified, they tended to represent educational conditions that were more responsive to students in high-ability classes than students placed in middle and low classes.

The data also suggest that a narrow range of activities and instructional methodologies characterized the educational experiences of all students in the study. These striking similarities in content and instruction across ability groups seriously challenge the rationale for sorting students. Instead of widely varied educational practices, offered to help each student learn in the most appropriate

way, there was a numbing similarity of practices and content both within and among classes.

The findings in this study, then, add to the mounting evidence that calls for a change in the present grouping practices in American public schools. Only when schools stop sorting youth for learning by placing them into ability groups will it be possible to provide equitable access to quality education for all students.

A P P E N D I C E S

A P P E N D I X A

FIVE MINUTE INTERACTION

FIVE MINUTE INTERACTION

TIME STARTED

HOUR MINUTE

1

	WHO	TO WHOM	WHAT	Cx.	How
A	T A O	T A O	1 2 3 4	E A	MV T X M H
S	S D L	S D Z	5 6 7 8	O S	Z
C	Sh M L	Sh M L	9 10 11 12		I O M O C

2

	WHO	TO WHOM	WHAT	Cx.	How
A	T A O	T A O	1 2 3 4	E A	MV T X M H
S	S D L	S D Z	5 6 7 8	O S	Z
C	Sh M L	Sh M L	9 10 11 12		I O M O C

3

	WHO	TO WHOM	WHAT	Cx.	How
A	T A O	T A O	1 2 3 4	E A	MV T X M H
S	S D L	S D Z	5 6 7 8	O S	Z
C	Sh M L	Sh M L	9 10 11 12		I O M O C

4

	WHO	TO WHOM	WHAT	Cx.	How
A	T A O	T A O	1 2 3 4	E A	MV T X M H
S	S D L	S D Z	5 6 7 8	O S	Z
C	Sh M L	Sh M L	9 10 11 12		I O M O C

5

	WHO	TO WHOM	WHAT	Cx.	How
A	T A O	T A O	1 2 3 4	E A	MV T X M H
S	S D L	S D Z	5 6 7 8	O S	Z
C	Sh M L	Sh M L	9 10 11 12		I O M O C

6

	WHO	TO WHOM	WHAT	Cx.	How
A	T A O	T A O	1 2 3 4	E A	MV T X M H
S	S D L	S D Z	5 6 7 8	O S	Z
C	Sh M L	Sh M L	9 10 11 12		I O M O C

7

	WHO	TO WHOM	WHAT	Cx.	How
A	T A O	T A O	1 2 3 4	E A	MV T X M H
S	S D L	S D Z	5 6 7 8	O S	Z
C	Sh M L	Sh M L	9 10 11 12		I O M O C

8

	WHO	TO WHOM	WHAT	Cx.	How
A	T A O	T A O	1 2 3 4	E A	MV T X M H
S	S D L	S D Z	5 6 7 8	O S	Z
C	Sh M L	Sh M L	9 10 11 12		I O M O C

9

	WHO	TO WHOM	WHAT	Cx.	How
A	T A O	T A O	1 2 3 4	E A	MV T X M H
S	S D L	S D Z	5 6 7 8	O S	Z
C	Sh M L	Sh M L	9 10 11 12		I O M O C

10

	WHO	TO WHOM	WHAT	Cx.	How
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S	S D L	S D Z	5 6 7 8	O S	Z
C	Sh M L	Sh M L	9 10 11 12		I O M O C

11

	WHO	TO WHOM	WHAT	Cx.	How
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S	S D L	S D Z	5 6 7 8	O S	Z
C	Sh M L	Sh M L	9 10 11 12		I O M O C

12

	WHO	TO WHOM	WHAT	Cx.	How
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S	S D L	S D Z	5 6 7 8	O S	Z
C	Sh M L	Sh M L	9 10 11 12		I O M O C

13

	WHO	TO WHOM	WHAT	Cx.	How
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S	S D L	S D Z	5 6 7 8	O S	Z
C	Sh M L	Sh M L	9 10 11 12		I O M O C

14

	WHO	TO WHOM	WHAT	Cx.	How
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S	S D L	S D Z	5 6 7 8	O S	Z
C	Sh M L	Sh M L	9 10 11 12		I O M O C

15

	WHO	TO WHOM	WHAT	Cx.	How
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S	S D L	S D Z	5 6 7 8	O S	Z
C	Sh M L	Sh M L	9 10 11 12		I O M O C

16

	WHO	TO WHOM	WHAT	Cx.	How
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S	S D L	S D Z	5 6 7 8	O S	Z
C	Sh M L	Sh M L	9 10 11 12		I O M O C

17

	WHO	TO WHOM	WHAT	Cx.	How
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S	S D L	S D Z	5 6 7 8	O S	Z
C	Sh M L	Sh M L	9 10 11 12		I O M O C

18

	WHO	TO WHOM	WHAT	Cx.	How
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S	S D L	S D Z	5 6 7 8	O S	Z
C	Sh M L	Sh M L	9 10 11 12		I O M O C

19

	WHO	TO WHOM	WHAT	Cx.	How
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S	S D L	S D Z	5 6 7 8	O S	Z
C	Sh M L	Sh M L	9 10 11 12		I O M O C

20

	WHO	TO WHOM	WHAT	Cx.	How
A	T A O	T A O	1 2 3 4	E A	MV T X M H
S	S D L	S D Z	5 6 7 8	O S	Z
C	Sh M L	Sh M L	9 10 11 12		I O M O C

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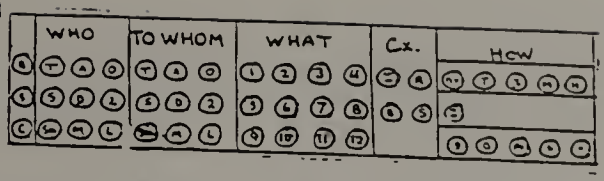

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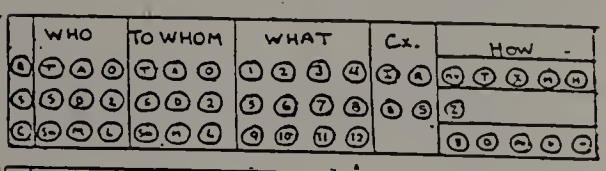

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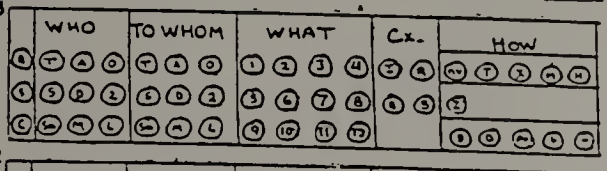

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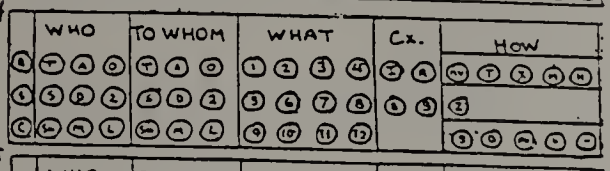

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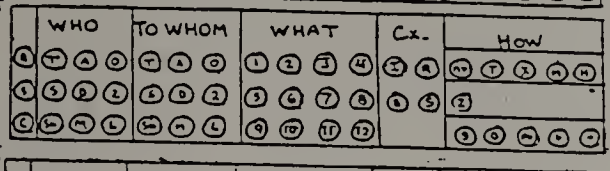

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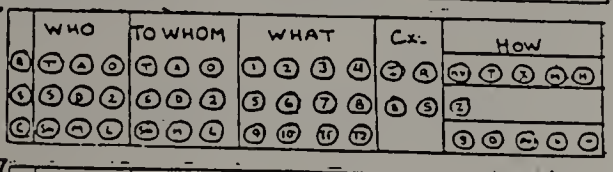

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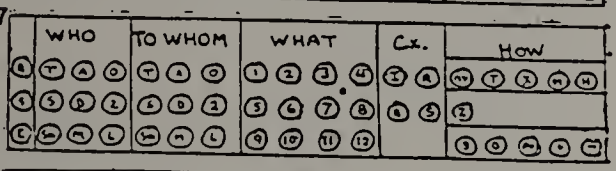

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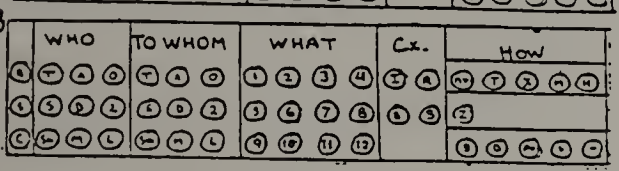

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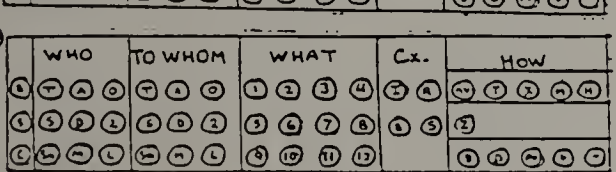

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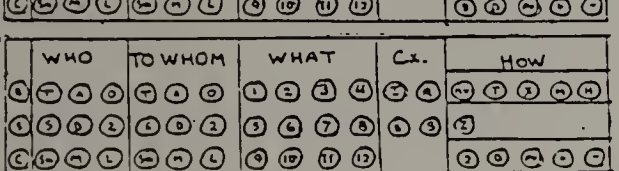

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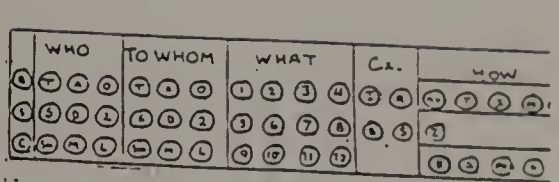

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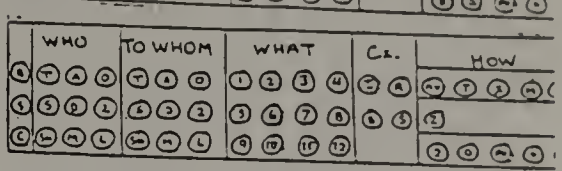

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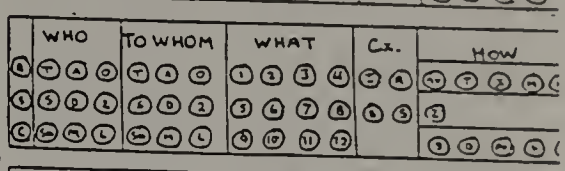

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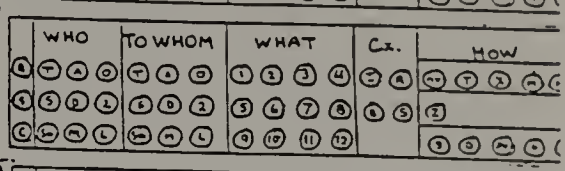

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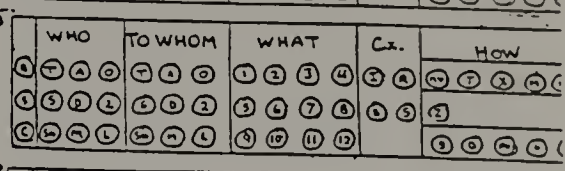

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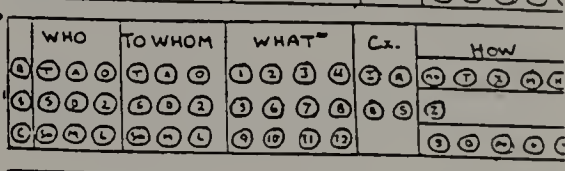

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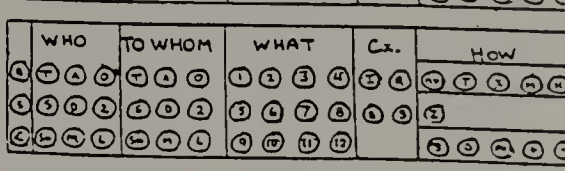

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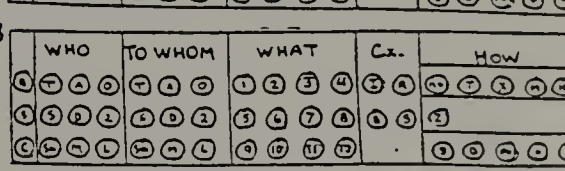

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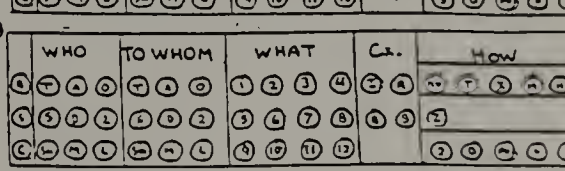

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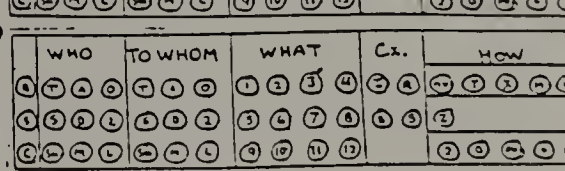

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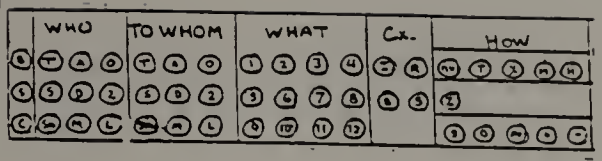

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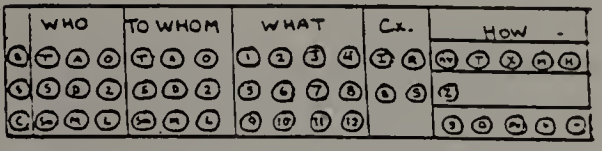

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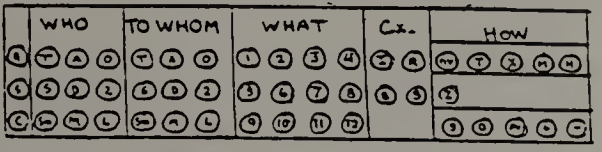

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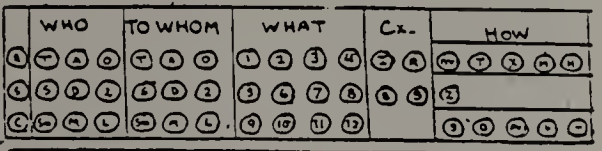

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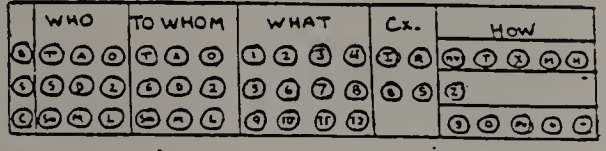

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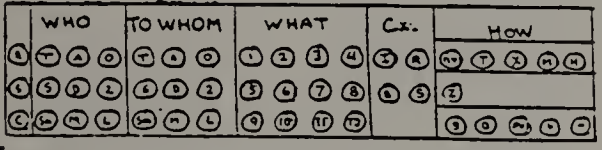

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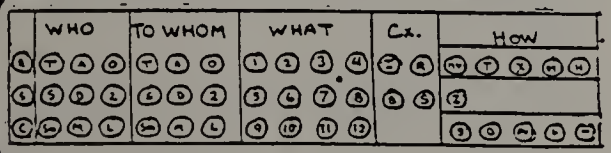

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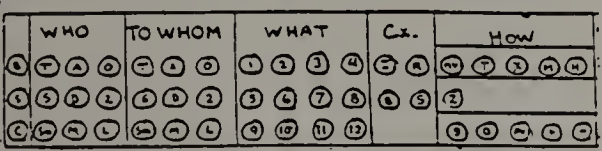

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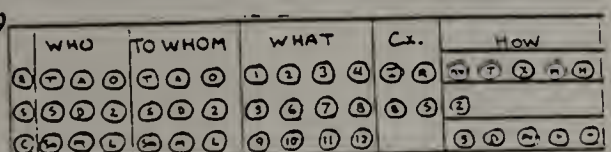

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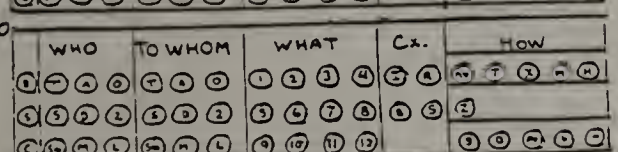

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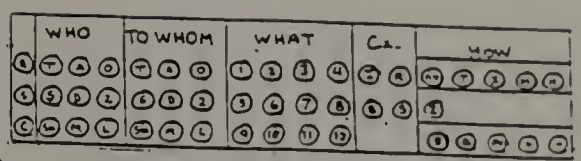

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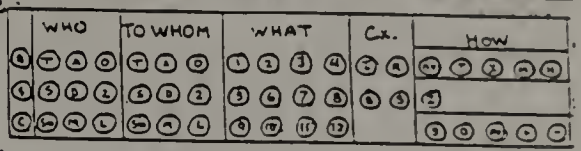

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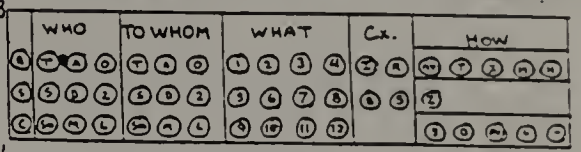

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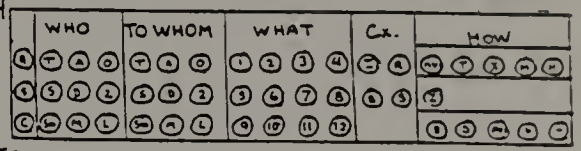

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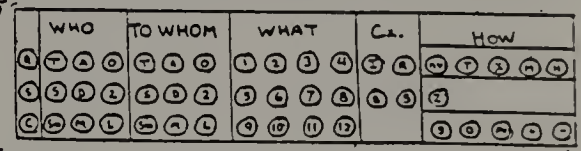

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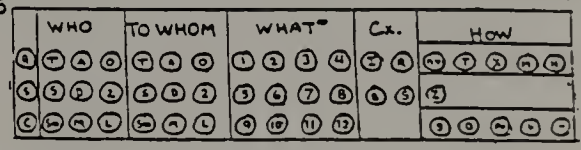

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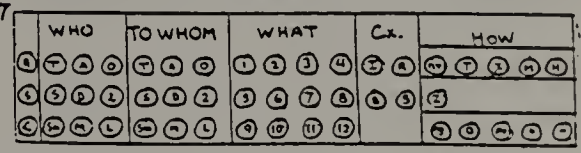

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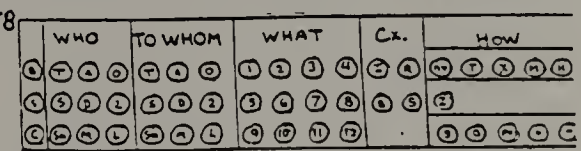

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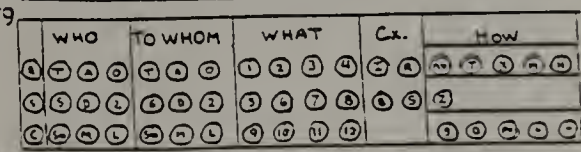

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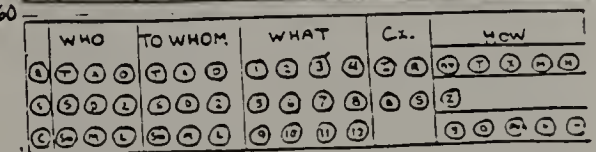

HOUR | MINUTE

61

	WHO	TO WHOM	WHAT	Cx.	HOW
	T A O	T A O	1 2 3 4		T X
	S D 2	S D 2	5 6 7 8	5	
C	L	L	9 10 11 12		

62

	WHO	TO WHOM	WHAT	Cx.	HOW
	T A O	T A O	1 2 3 4		T X
	S D 2	S D 2	5 6 7 8	5	
C	L	L	9 10 11 12		

63

	WHO	TO WHOM	WHAT	Cx.	HOW
	T A O	T A O	1 2 3 4		T X
	S D 2	S D 2	5 6 7 8	5	
C	L	L	9 10 11 12		

64

	WHO	TO WHOM	WHAT	Cx.	HOW
	T A O	T A O	1 2 3 4		T X
	S D 2	S D 2	5 6 7 8	5	
C	L	L	9 10 11 12		

65

	WHO	TO WHOM	WHAT	Cx.	HOW
	T A O	T A O	1 2 3 4		T X
	S D 2	S D 2	5 6 7 8	5	
C	L	L	9 10 11 12		

66

	WHO	TO WHOM	WHAT	Cx.	HOW
	T A O	T A O	1 2 3 4		T X
	S D 2	S D 2	5 6 7 8	5	
C	L	L	9 10 11 12		

67

	WHO	TO WHOM	WHAT	Cx.	HOW
	T A O	T A O	1 2 3 4		T X
	S D 2	S D 2	5 6 7 8	5	
C	L	L	9 10 11 12		

68

	WHO	TO WHOM	WHAT	Cx.	HOW
	T A O	T A O	1 2 3 4		T X
	S D 2	S D 2	5 6 7 8	5	
C	L	L	9 10 11 12		

69

	WHO	TO WHOM	WHAT	Cx.	HOW
	T A O	T A O	1 2 3 4		T X
	S D 2	S D 2	5 6 7 8	5	
C	L	L	9 10 11 12		

70

	WHO	TO WHOM	WHAT	Cx.	HOW
	T A O	T A O	1 2 3 4		T X
	S D 2	S D 2	5 6 7 8	5	
C	L	L	9 10 11 12		

71

	WHO	TO WHOM	WHAT	Cx.	HOW
	T A O	T A O	1 2 3 4		T X
	S D 2	S D 2	5 6 7 8	5	
C	L	L	9 10 11 12		

72

	WHO	TO WHOM	WHAT	Cx.	HOW
	T A O	T A O	1 2 3 4		T X
	S D 2	S D 2	5 6 7 8	5	
C	L	L	9 10 11 12		

73

	WHO	TO WHOM	WHAT	Cx.	HOW
	T A O	T A O	1 2 3 4		T X
	S D 2	S D 2	5 6 7 8	5	
C	L	L	9 10 11 12		

74

	WHO	TO WHOM	WHAT	Cx.	HOW
	T A O	T A O	1 2 3 4		T X
	S D 2	S D 2	5 6 7 8	5	
C	L	L	9 10 11 12		

75

	WHO	TO WHOM	WHAT	Cx.	HOW
	T A O	T A O	1 2 3 4		T X
	S D 2	S D 2	5 6 7 8	5	
C	L	L	9 10 11 12		

76

	WHO	TO WHOM	WHAT	Cx.	HOW
	T A O	T A O	1 2 3 4		T X
	S D 2	S D 2	5 6 7 8	5	
C	L	L	9 10 11 12		

77

	WHO	TO WHOM	WHAT	Cx.	HOW
	T A O	T A O	1 2 3 4		T X
	S D 2	S D 2	5 6 7 8	5	
C	L	L	9 10 11 12		

78

	WHO	TO WHOM	WHAT	Cx.	HOW
	T A O	T A O	1 2 3 4		T X
	S D 2	S D 2	5 6 7 8	5	
C	L	L	9 10 11 12		

79

	WHO	TO WHOM	WHAT	Cx.	HOW
	T A O	T A O	1 2 3 4		T X
	S D 2	S D 2	5 6 7 8	5	
C	L	L	9 10 11 12		

80

	WHO	TO WHOM	WHAT	Cx.	HOW
	T A O	T A O	1 2 3 4		T X
	S D 2	S D 2	5 6 7 8	5	
C	L	L	9 10 11 12		

A P P E N D I X B

CLASSROOM SNAPSHOT

CLASSROOM SNAPSHOT

ACTIVITIES		One Student	Small Groups	Medium Groups	Large Groups	Total Class
Eng Math Sci S.S. Arts F.L. P.E.	T					
1. Preparation for Assignments or Instructions/Cleanup	A					
	C					
	I					
Eng Math Sci S.S. Arts F.L. P.E. Story Time Materials and Equipment	T					
2. Explain, Lecture, or Read Aloud	A					
	S					
Eng Math Sci S.S. Arts F.L. P.E.	T					
3. Demonstration	A					
	S					
Eng Math Sci S.S. Arts F.L. P.E.	T					
4. Discussion	A					
	C					
Eng Math Sci S.S. Arts F.L. P.E.	T					
5. Simulation, Role Playing	A					
	C					
Eng Math Sci S.S. Arts F.L. P.E.	T					
6. Reading	A					
	C					
	I					
Eng Math Sci S.S. Arts F.L. P.E.	T					
7. Work on Written Assignments	A					
	C					
	I					
Eng Math Sci S.S. Arts F.L. P.E.	T					
8. Practice or Perform (psycho-motor, physical)	A					
	C					
	I					
Eng Math Sci S.S. Arts F.L. P.E.	T					
9. Practice or Perform (verbal)	A					
	C					
	I					
Eng Math Sci S.S. Arts F.L. P.E.	T					
10. Taking Test or Quiz	A					
	C					
	I					
Eng Math Sci S.S. Arts F.L. P.E.	C					
11. Audio Visual Equipment ○ Television, Radio ○ Tapes, Records ○ Teaching Machines ○ Films, Filmstrips	I					

12. Student Non-Task Behavior or Teacher Social Interaction with Student(s) — No Assignment

T ⓪①②③④ ⓪①②③ ⓪①② ⓪① ⓪
A ⓪①②③④ ⓪①②③ ⓪①② ⓪① ⓪
C ⓪①②③④ ⓪①②③ ⓪①② ⓪① ⓪
I ⓪①②③④ ⓪①②③ ⓪①② ⓪① ⓪

○ Eng ○ Math ○ Sci ○ S.S. ○ Arts ○ F.L. ○ P.E. ○ No Subject

T ⓪①②③④ ⓪①②③ ⓪①② ⓪① ⓪
A ⓪①②③④ ⓪①②③ ⓪①② ⓪① ⓪

13. Adult Disciplining Students

○ Eng ○ Math ○ Sci ○ S.S. ○ Arts ○ F.L. ○ P.E.

●⓪①②③④ Teacher ⓪①②③④ Aides

14. Adult Monitoring and/or Observing Students

○ Eng ○ Math ○ Sci ○ S.S. ○ Arts ○ F.L. ○ P.E. ○ No Subject

⓪①②③④ Teacher ⓪①②③④ Aides

15. Adult Controlled Routines

○ Eng ○ Math ○ Sci ○ S.S. ○ Arts ○ F.L. ○ P.E.

⓪①②③④ Teacher ⓪①②③④ Aides

16. Adult Not Involved

○ Eng ○ Math ○ Sci ○ S.S. ○ Arts ○ F.L. ○ P.E.

C ⓪①②③④⑤ ⓪①②③④ ⓪①②③ ⓪① ⓪
I ⓪①②③④⑤ ⓪①②③④ ⓪①②③ ⓪① ⓪

17. Students Not ____ During Subject

○ 0-24% ○ 25-49% ○ 50-74% ○ 75-100%

18. Percent ____ at High Interest Level

For This Snapshot Only

Number of Teachers in Classroom ⓪①②③④

Number of Aides in Classroom ⓪①②③④

Number of Visitors in Classroom ⓪①②③④

Number of Students

⓪⓪
①①
②②
③③
④④
⑤⑤
⑥⑥
⑦⑦
⑧⑧
⑨⑨

A P P E N D I X C

STUDENT CLASSROOM CLIMATE QUESTIONNAIRE

INSTRUCTIONS TO STUDENTS

We are interested in your ideas about this class. You know a lot about your classes because you spend a good deal of time attending and working in them. We are asking you to be a reporter and tell your thoughts about your experiences in this class.

Please understand that this is not a test, and there are no right or wrong answers. In fact, we do not even ask for your name. We simply want your honest ideas about this class.

There are 40 questions we would like you to answer. The first 36 are sentences about this class. Please show how accurately you think the statement describes your class by marking the circle under STRONGLY AGREE, MILDLY AGREE, MILDLY DISAGREE, OR STRONGLY DISAGREE. Mark only one circle for each statement.

The last four questions ask you to tell us about some of the things you do in class. Follow the directions for each of the four items.

Take your time and think about each sentence or question. Make sure you answer each question. Remember that your teacher will n o t know how you have answered any of the items on these pages, so answer them as honestly as you can.

Now turn to the next page and begin.

STUDENT QUESTIONNAIRE

	STRONGLY AGREE	MILDLY AGREE	MILDLY DISAGREE	STRONGLY DISAGREE
1. We know exactly what we have to get done in this class.	0	0	0	0
2. The teacher tells us how to correct the mistakes in our work.	0	0	0	0
3. We are free to talk in this class about anything we want.	0	0	0	0
4. Students help make the rules for this class.	0	0	0	0
5. We are free to work with anyone we want to in this class.	0	0	0	0
6. This teacher seems to like being a teacher.	0	0	0	0
7. We can decide what we want to learn in this class.	0	0	0	0
8. The teacher tells me how to correct the mistakes in my work.	0	0	0	0
9. This teacher lets us know when we have not learned something well.	0	0	0	0
10. I do not have enough time to do my work for this class.	0	0	0	0
11. The teacher seems to enjoy what he/she is teaching.	0	0	0	0
12. We know why the things we are learning in this class are important.	0	0	0	0
13. The grades or marks I get in this class help me to learn better.	0	0	0	0
14. We don't know what the teacher is trying to get us to learn in this class.	0	0	0	0
15. The teacher seems bored in this class.	0	0	0	0
16. We know when we have learned things correctly.	0	0	0	0
17. The teacher uses words I can understand.	0	0	0	0
18. The teacher gives clear directions.	0	0	0	0
19. Some of the things the teacher wants us to learn are just too hard.	0	0	0	0
20. Many students don't know what they're supposed to be doing during class.	0	0	0	0
21. I have trouble reading the books and				

other materials in this class.	STRONGLY AGREE	MILDLY AGREE	MILDLY DISAGREE	STRONGLY DISAGREE
22. Students help decide what we do in this class.	0	0	0	0
23. This class is disorganized.	0	0	0	0
24. The grades or marks I get in this class have nothing to do with what I really know.	0	0	0	0
25. We have to learn things without knowing why.	0	0	0	0
26. Different students can do different things in this class.	0	0	0	0
27. Sometimes I can study or do things I am interested in even if they are different from what other students are studying or doing.	0	0	0	0
28. The teacher gives me too much work to do in this class.	0	0	0	0
29. Students know the goals of this class.	0	0	0	0
30. The students understand what the teacher is talking about.	0	0	0	0
31. I help decide what I do in this class.	0	0	0	0
32. Things are well planned in this class.	0	0	0	0
33. I understand what the teacher is talking about.	0	0	0	0
34. Our teacher gives us good reasons for learning in this class.	0	0	0	0
35. Everyone in this class knows what we may or may not do.	0	0	0	0
36. The teacher tells us ahead of time what we are going to be learning about.	0	0	0	0

Mark the circle under the word "most" for the thing that takes the most time.

Mark the circle under the words "Next Most" for the thing that takes the next most time.

Mark the circle under the word "Least" for the thing that takes the least amount of time.

	Least	Next Most	Most
1. Daily routines (passing out materials, taking attendance, making announcements)	0	0	0
2. Learning	0	0	0
3. Getting students to behave	0	0	0

38. On the average, how much time do you spend on homework a day?

0 none
0 about half an hour
0 about one hour
0 about two hours
0 more than two hours

39. Which of the following things are used in your history class as part of your lessons? Mark the YES circle if you have used the material in class; mark the NO circle if you have not used it.

YES	NO	
0	0	Textbooks
0	0	Other books
0	0	Work sheets
0	0	Films, filmstrips, or slides
0	0	Learning kits
0	0	Games or simulations
0	0	Newspapers or magazines
0	0	Tape recordings or records
0	0	Television
0	0	Computers

40. Which of the following activities have you done in your history class? Mark the YES circle if you have done the activity in class; mark the NO circle if you have not done it.

YES	NO	
O	O	Listen to the teacher when s/he talks or demonstrates how to do something
O	O	Go on field trips
O	O	Do research and write reports, stories, or poems
O	O	Make maps
O	O	Listen to student reports
O	O	Listen to speakers who come to class
O	O	Have class discussions
O	O	Build or draw things
O	O	Have a debate
O	O	Write answers to questions
O	O	Read a textbook in class
O	O	Take tests or quizzes
O	O	Make charts or diagrams
O	O	Make films or recordings
O	O	Conduct an interview or opinion poll
O	O	Act things out

A P P E N D I X D

TEACHER CLASSROOM CLIMATE QUESTIONNAIRE

INSTRUCTIONS TO TEACHERS

This questionnaire is part of a curriculum study project of the Curriculum Center at the University of Massachusetts. We are looking at ways in which teachers adapt their classes to students in different ability groups. As the teacher, you more than anyone else are aware of the daily routines and activities in your classes. We ask your help in filling out the five items on the questionnaire about your history class. We hope that the information we gather from you will prove valuable for making future curriculum decisions.

Please be assured that your responses will remain annonymous. Information will be gathered from many different schools, and your questionnaire will be used only as a part of groups of teachers' responses.

Thank you for your time and concern.

TEACHER QUESTSIONNAIRE

1. On the average, approximately what percentage of class time is spent on each of the following?

	0	10	20	30	40	50	60	70	80	90	100 %
Daily routine (getting started, passing out materials, taking attendance, making announcements, messages, intercom, preparing to leave)	0	0	0	0	0	0	0	0	0	0	0
Instruction	0	0	0	0	0	0	0	0	0	0	0
Getting students to behave	0	0	0	0	0	0	0	0	0	0	0

2. How much time do you expect your students on the average to spend on homework?

   0 none
   0 about half an hour
   0 about one hour
   0 about two hours
   0 more than two hours

3. How often do you use the following materials in your History class?

	never	not very often	often	always or most of the time
textbooks	0	0	0	0
other books	0	0	0	0
worksheets				
films, filmstrips, or slides	0	0	0	0
learning kits	0	0	0	0
games or simulations	0	0	0	0
newspapers or magazines	0	0	0	0
tape recordings or records	0	0	0	0
television	0	0	0	0
computers	0	0	0	0

4. Which of the following activities have you had the students do as part of their work in your history class? Mark the YES circle if you have done the activity in class; mark the NO circle if you have not done it.

YES	NO	
O	O	Listen to the teacher when s/he talks or demonstrates how to do something
O	O	Go on field trips
O	O	Do research and write reports, stories, or poems
O	O	Make maps
O	O	Listen to student reports
O	O	Listen to speakers who come to class
O	O	Have class discussions
O	O	Build or draw things
O	O	Have a debate
O	O	Write answers to questions
O	O	Read a textbook in class
O	O	Take tests or quizzes
O	O	Make charts or diagrams
O	O	Make films or recordings
O	O	Conduct an interview or opinion poll
O	O	Act things out

5. If you had to rank order them from most important on down, what are the five most critical things you want the students in your period U.S. History class to learn this year? By learn, we mean everything that the student should have upon leaving class that s/he did not have upon entering. (List no more than five.)

1.

2.

3.

4.

5.

A P P E N D I X E

SELECTED CORRESPONDENCES WITH SCHOOLS

UNIVERSITY OF MASSACHUSETTS
AT AMHERST

School of Education
Amherst, MA 01003
(413) 545-3642

January 15, 1985

Don Frizzle, Superintendent
Amherst-Pelham Regional High School
170 Chestnut Street
Amherst, MA 01002

Dear Dr. Frizzle

As part of our continuing commitment to cooperation with schools for bringing about improvement, the Center for Curriculum Studiea is undertaking an inquiry into ability grouping. This research is intended to provide teachers and administrators of the participating schools with an in-depth picture of several aspecta of educational environments exiating in different ability-grouped classes. More specifically, we will be looking at how teachers adapt their teaching to meet the diverse educational needs of students within these different ability levels. Our inquiry will focus upon thirty United States History classes in ten selected schools in Massachusetts. We hope that these data will be useful as a base for future curriculum directions and decisions. We would like to invite your school to consider participating in this important project.

This spring we will make two visits to each school chosen to participate in the project. During our first visit, three United States history claaaea will be obaerved. The second viait will include the administration of a short questionnaire to all students and teachers in the aame three clasaes. This will take about 30 minutes. We have included a brief summary of our research plan as additional information for you.

Pleaae let us know your plans for participating in the project by returning the pre-addressed letter to the Center for Curriculum Studies. If you have any questions or would like further information, please contact the project director, Kim Trimble, at the Center (413-545-3642).

Thank you for your consideration. We look forward to cooperating with you in this effort to create effective learning environments for all learners.

Sincerely,

Robert L. Sinclair, Director
Center for Curriculum Studies

Kim Trimble, Director
Effective Secondary Education Study

Effective Secondary Education Study

Ability Grouping in United States History Classes

Center for Curriculum Studies

University of Massachusetts School of Education

Dr. Robert L. Sinclair, Director
Center for Curriculum Studies
Professor of Curriculum and Instruction

Mr. Kim Trimble, Director
Effective Secondary Education Study

PROBLEM

The vast majority of secondary schools--more than three-quarters by recent counts--divide students into groups for instruction based upon some criterion of perceived or measured ability. One of the major justification for this grouping by ability is the need to reduce the range of students' educational skills and background within each classroom. This reduction is seen to allow teachers to adapt more readily the content and instruction to the needs of the students in the class.

Despite ability grouping's widespread use as an organizational scheme, however, little is known about how teachers make these adaptations to meet the needs of the students in these classes. This study will look at classrooms to gain a better understanding of how teachers match the content and instruction to their students.

PURPOSE

The purpose of this study is to address the need for information about educational experiences which teachers create within ability-grouped classes. To this end, two aspects of teachers' adaptations to students within different ability grouped classes will be examined: instructional behavior and curricular content.

Research Questions

In concentrating upon the similarities and differences in both curricular content and instructional behavior across various ability-tracked classes, the study will specifically address the following questions:

To what degree does curricular content differ across ability grouping levels in high school United States History classes?

To what degree do instructional practices differ across ability grouping levels in high school United States History classes?

VARIABLES

In addressing the research objectives this study will examine an array of several important variables which characterize the classroom experiences of students within different grouping levels. These variables have been identified through a review of the literature as aspects of effective instruction. Included here are a brief description of each variable and a listing of instruments to be used to gather data about the variable.

Time on instruction

This variable represents the relative amount of time spent by students

on instruction or learning activities. Responses to items from the Student Questionnaire and the Teacher Questionnaire and data from the Classroom Snapshot and the Five-Minute Interaction will be used to gauge this variable.

Cognitive level of skills and instructional activities

This variable represents the nature of instructional content and activities presented by teachers in their classes. Information from the Teacher Questionnaire and examination of written curricular material will be used to gauge this variable.

Teacher variability

This variable represents the variety of materials and instructional techniques provided by teachers to students in their classrooms. Students' and teachers' responses to several items on the Student Questionnaire and the Teacher Questionnaire and observation data from the Classroom Snapshot and the Five-Minute Interaction will be used to gauge this variable.

Teacher clarity

This variable represents perceived clarity of teachers' oral instructions and classroom organization. Students' responses to several items on the Student Questionnaire will be used to gauge this variable.

Teacher enthusiasm

This variable represents students' perceptions of how much teachers seem to enjoy teaching their classes. Information from students gathered from a set of items on the Student Questionnaire will be used to gauge this variable.

Student involvement

This variable represents the manner in which students engage in learning activities. Information gathered from students and teachers using the Student Questionnaire and the Teacher Questionnaire, in addition to classroom observations made with the Classroom Snapshot and the the Five-Minute Interaction, will be used to gauge this variable.

DESIGN OF THE STUDY

Sample

The sample of classrooms for this study will be drawn from ten New England public high schools. The ten schools chosen to participate in the study will represent a variety of characteristics: school size, economic status, ethnicity, and location. This range of characteristics of the schools is meant to provide a wide spectrum of schools in which to observe teachers and students. At each participating school, three United States history classes will be randomly selected for observation--one high-ability class, one average-ability class, and one low-ability class. Thus, thirty classes--three from each of the participating ten schools--will serve as the sample for the study.

Instrumentation

Four instruments will be used to gather data for the project: the Five-Minute Interaction, the Classroom Snapshot, the Teachers' Questionnaire, and the STudents' Questionnaire. These instruments are adaptations of instruments used in John Goodlad's A Study of Schooling.

The Five-Minute Interaction, developed by Stanford Research Institute and modified for use for A Study of Schooling, will be used to record interactions which occur in the classroom. During the one-period class

observation, each verbal or nonverbal interaction made by or directed to a teacher is coded to identify the speaker, person spoken to, content of the remark, instructional relevancy, and major affective elements.

The Classroom Snapshot, also developed by Stanford Research Institute and used in A Study of Schooling, will be utilized in classroom observations, as well. Used at ten-minute intervals, the Classroom Snapshot is designed to collect data about the nature of on-going classroom activities. All participants in the classroom at the time of the recording are placed in categories describing the type of activity being engaged in. The instrument thus allows student and teacher behaviors and classroom configurations to be identified and noted.

The Teachers' Questionnaire will be administered to teachers of the three selected classes at each research site. The questionnaire consists of five items which ask the teacher to provide information about classroom goals and activities. The completion of the questionnaire takes about fifteen minutes.

The Students' Questionnaire will be administered to all students present in the three selected classes at each research site. Consisting of 40 multiple choice questions, the questionnaire solicits students' perceptions about classroom activities. The administration and completion of the questionnaire takes about 30 minutes.

TREATMENT OF DATA

A profile of each class will be made based upon students' and teachers' responses to questionnaires and data collected in classroom observations. High-ability classes, average-ability classes, and low-ability classes from all participating schools will then be compared to determine any similarities among ability classes.

For the purpose of the research project, each classroom and school will be treated anonymously. A profile of the three classes observed in each school, as well as a comparison of the three classes to classes in other participating schools, however, will be provided to each school or superintendent for consideration.

Dr. Robert Sinclair
Mr. Kim Trimble
Center for Curriculum Studies
School of Education
University of Massachusetts
Amherst, MA 01002

----------fold here----------

----------fold here----------

_____ _____
Name of School City and State

_____
School Telephone

_____ _____
Superintendent of School High School Principal

_____
Name and Home Phone of Contact Person

_____ We are definitely interested in participating in the project.

_____ We are tentatively interested in participating in the project.

_____ We are not interested in this project.

UNIVERSITY OF MASSACHUSETTS
AT AMHERST

School of Education
Amherst, MA 01003
(413) 545-3642

Center for Curriculum Studies

February 12, 1985

James Cavallo
Ludlow High School
63 Chestnut Street
Ludlow, MA 01056

Dear Mr. Cavallo,

Many schools have written expressing their interest in participating in our research project into ability grouping and teacher adaptation of instruction. Yet, we have not heard from your school system concerning your plans. We will soon be making decisions about which schools will be selected and would like to consider your school. We would appreciate you completing, folding, and returning the enclosed response form by the end of February. If this reminder crossed your response in the mail, you will be hearing from us again shortly after we receive your correspondence. Should special circumstances make complying with this deadline difficult, do not hesitate to write or telephone us to explain the problem (413-545-3642).

Some administrators have found it helpful to discuss the project in more detail over the telephone before expressing strong interest in the project. Please feel free to ask for more information which you need to make a decision.

We look forward to hearing from you soon and cooperating with you in this effort to create effective learning environments for all learners.

Sincerely,

Robert L. Sinclair, Director
Center for Curriculum Studies

Kim Trimble, Director
Effective Secondary Education Study

Enclosure

UNIVERSITY OF MASSACHUSETTS
AT AMHERST

School of Education
Amherst, MA 01003
(413) 545-3642

April 18, 1985

James Cavallo
Ludlow High School
63 Chestnut Street
Ludlow, MA 01056

Dear Mr. Cavallo,

Thank you for your serious interest in learning more about how teachers can adapt their classes to meet better the needs of their students. We are pleased that you will be participating in the Effective Schooling Study.

We plan to schedule two school visitations during the week of May 7. We will contact you in the near future to confirm dates of your choice during this week.

We would like to outline briefly the agenda for our visits. At the outset, a short meeting with the head of the social studies department will be held to provide general information about the U.S. history program. Also during the first day, three United States history classes from three different ability levels will be observed. We would prefer to visit a different teacher for each level, if scheduling permits. As part of our activities on the second day, a 30-minute questionnaire will be administered to all students in the previously observed classes. Teachers of the three classes will also be asked to fill out a short questionnaire. It would be helpful if the teacher could be present for the first five minutes of the class.

In approximately six to eight weeks after the visit profiles of the classes will be forwarded to you. The profiles will highlight the ways in which teachers adapt their teaching and materials to students in different ability-grouped classes. In addition, information comparing your school to other sampled schools will be provided. This information will help identify ways in which teachers promote appropriate learning for students in different ability classes.

Again, thank you for the opportunity to cooperate with your school in generating information related to the important and difficult tasks teachers face in teaching classes of different ability groups. We will telephone you in the near future to schedule mutually agreeable visitation days.

Sincerely,

Kim Trimble
Effective Education Study
Center for Curriculm Studies

UNIVERSITY OF MASSACHUSETTS
AT AMHERST

School of Education
Amherst, MA 01003
(413) 545-3642

July 9, 1985

James Cavallo
Ludlow High School
63 Chestnut Street
Ludlow, MA 01056

Dear Mr. Cavallo,

Thank you for your cooperation in my recent visitations to your school. Your helpfulness--and the friendliness of your social studies staff--made my stay both pleasant and productive. Please pass on my thanks to Mr. Williams and the other teachers.

We are presently processing the information collected at Ludlow and the other schools in the project. We will complete the preliminary stage of the data analysis this month. You can expect a report of the observations from your school by the middle of August.

Once again, thank you for your assistance in the work of the project. I look forward to working with you and your school again.

Sincerely,

Kim Trimble

Kim Trimble
Effective Education Study
Center for Curriculm Studies

UNIVERSITY OF MASSACHUSETTS
AT AMHERST

School of Education
Amherst, MA 01003
(413) 545-3642

December 3, 1986

James Cavallo
Ludlow High School
63 Chestnut Street
Ludlow, MA 01056

Dear Mr. Cavallo,

In the spring of 1985, you kindly participated in a research project about student perceptions of curriculum in different levels of U.S. history classes. This study was conducted in collaboration with the Center for Curriculum Studies at the University of Massachusetts. As part of this study, a researcher observed three history classes, surveyed students in these classes, and collected information from administrators and members of the social studies department.

Attached for your use are the collective responses of the student questionnaires in your school. We have also included summaries of student responses from all seven schools which were visited, and a brief report based upon information collected in your school and the other participating schools in western Massachusetts. We hope the information will be useful to you in thinking about curriculum and instruction in your school.

If you are interested in further information about the study or if the participating teachers would like to receive individual class summaries, please contact Kim Trimble at the Center for Curriculum Studies, School of Education, University of Massachusetts, Amherst, MA 01060 (413-545-3642).

Once again, thank you for your cooperation. It was indeed a pleasure working with professionals who are committed to quality education for all students. Best wishes.

Sincerely,

Kim Trimble
Project Coordinator

Robert L. Sinclair
Professor of Education

UNIVERSITY OF MASSACHUSETTS
AT AMHERST

School of Education
Amherst, MA 01003
(413) 545-3642

December 3, 1986

Ron Lech
East Longmeadow H. S.
180 Maple St.
East Longmeadow, MA 01028

Dear Mr. Lech

In the spring of 1985, you kindly participated in a research project about student perceptions of curriculum in different levels of U. S. history classes. This study was conducted in collaboration with the Center for Curriculum Studies at the University of Massachusetts. As part of this study, a researcher observed your class, surveyed your students, and collected information from you and other members of the social studies department.

Attached for your use are the summaries of responses by your class. We have also included summaries of student responses from all seven schools which were visited, and a brief report based upon information collected in your school and the other participating schools in western Massachusetts. We hope the information will be useful to you in thinking about curriculum and instruction.

If you would be interested in further information about the study or would like a copy of the complete report, please contact Kim Trimble at the Center for Curriculum Studies, School of Education, University of Massachusetts, Amherst, MA 01060 (413-545-3642).

Once again, thank you for your cooperation. It was indeed a pleasure working with professionals who are committed to quality education for all students. Best wishes.

Sincerely,

Kim Trimble

Kim Trimble
Project Coordinator

Robert L. Sinclair

Robert L. Sinclair
Professor of Education

A P P E N D I X F

GENERAL INFORMATION INTERVIEW

GENERAL INFORMATION SHEET

Date _____
School _____
Contact _____
Position _____

How are students placed in U.S. History classes?

	major	minor
teacher recommendation	_____	_____
test scores	_____	_____
student choice	_____	_____
counselor decision	_____	_____
parent choice	_____	_____
other _____	_____	_____

How many levels of U.S. History classes are there in the school?

_____ one
_____ two
_____ three
_____ four
_____ five
_____ _____

What are the approximate percentage of students in each level?

____ _____
____ _____
____ _____
____ _____
____ _____
____ _____

Are there differentiated grades for different ability levels for figuring grade point averages?

_____ yes
_____ no

Is there differentiated content for U.S. History classes of different levels?

_____ yes
_____ no

Are there differentiated written objectives or requirements for U.S. History classes of different levels?

_____ yes
_____ no

How are teachers assisned to levels?

_____ teacher choice
_____ rotation
_____ _____

A P P E N D I X G

GOAL EVALUATION RATING SYSTEM

Cognitive Level of Skills and Instructional Activities

Instructions.

The following lists were submitted by high school U. S. History teachers as representing part of the content of their semester-long history class. Your task is to place each goal or topic in one of six categories relating to the level of cognitive skills required for the activity or goal.

Mark each goal with a number from 1 to 6 corresponding with Bloom's categories. Some of the goals may fall into the Affective Domain of Bloom's Taxonomy. Mark these AFFECT. Others may be impossible to classify. Mark these NOCLASS.

The relationship between social studies activities and cognitive level as discussed by Bloom are listed below.

1. Knowledge

Knowledge is defined as the remembering of previously learned material. This may involve the recall of a wide range of material, from specific facts to complete theories, but all that is required is the bringing to mind of appropriate information. Knowledge represents the lowest level of learning outcomes in cognitive domain.

examples: knows common terms
knows specific facts
knows methods and procedures
knows basic concepts
knows principles

2. Comprehension
Comprehension is defined as the ability to grasp the meaning of material. This may be shown by translating material from one form to another (words to numbers), by interpreting material (explaining or summarizing), and by estimating future trends (predicting consequences or effects). These learning outcomes go one step beyond the simple remembering of material, and represent the lowest level of understanding.

examples: understands facts and principles
interprets verbal material
interprets charts and graphs
translates verbal material to mathematical formulas
estimates future consequences implied in data
justifies methods and procedures

3. Application
Application refers to the ability to use learned material in new and concrete situations. This may include the application of such things as rules, methods, concepts, principles, laws, and theories. Learning

outcomes in this area require a higher level of understanding than those under comprehension.

examples: applies concepts and principles to new situations
applies laws and theories to practical situations
solves mathematical problems
constructs charts and graphs
demonstrates correct usage of a method or procedure

4. Analysis
Analysis refers to the ability to break down material into its component parts so that its organizational structure may be understood. This may include the identification of parts, analysis of the relationships between parts, and recognition of organizational principles involved. Learning outcomes here represent a higher intellectual level than comprehension and application because they require an understanding of both the content and the structural form of the material.

examples: recognizes unstated assumptions
recognizes logical fallacies in reasoning
distinguishes between facts and inferences
evaluates the relevancy of data
analyzes the organizational structure of a work (art,music, writing)

5. Synthesis
Synthesis refers to the ability to put parts together to form a new whole. This may involve the production of a unique communication (theme or speech), a plan of operations (research proposal), or a set of abstract relations (scheme for classifying information). Learning outcomes in this area stress creative behaviors, with major emphasis on the formulation of new patterns or structures.

examples: writes a well organized theme
gives a well organized speech
writes a creative short story (or poem, or music)
proposes a plan for an experiment
integrates learning from different areas into a plan for solving a problem
formulates a new scheme for classifying objects (or evenents, or ideas)

6. Evaluation
Evaluation is concerned with the ability to judge the value of material (statement, novel,poem, research report) for a given purpose. The judgments are to be based on definite criteria. these may be internal criteria (organization) or external criteria (relevance to the purpose) and the student may determine the criteria or be given them. Learning outcomes in this area are highest in the cognitive hierarchy because they contain elements of all of the other categories, plus conscious value judgments based on clearly defined criteria.

examples: judges the logical consistency of written materials
judges the adequacy with which conclusions are supported by data
judges the value of a work (art, music, writing) by use of internal criteria
judges the value of a work (art, music, writing) by use of external standards of excellence

01

_____ think about present-day issues with historical prespectiv#

_____ understand what democracy is and how it evolved

_____ have a basic knowledge of our past

_____ respect the opinions of others

_____ develop a sense of how the US fits into the world community

02

_____ a greater desire to read

_____ a greater understanding of the world in which they live

_____ to know more about the country in which they live (chronological development of U.S.)

_____ to understand that we can learn from what has gone before

_____ to want to become involved as citizens (give a damn)

03

_____ critical analytical ability

_____ written essay skill level

_____ knowledge of subject matter

_____ disciplined approach to study

_____ appreciation of value of humanities

04

_____ understand concepts

_____ be able to express themselves with concepts

_____ general understanding

_____ understand American History as it really was

_____ Show them some background on how life rally was in other periods

05

_____ basic knowledge of their country and background--develop an appreciation for "America"

_____ ability to analyze facts and situations and draw conclusions

_____ ability to relate current events to past and vice-versa

_____ ability to understand current situations through knowledge

(only four listed)

06

_____ ability to express themselves in subject matter

_____ have understanding of concepts

_____ good sold working knowledge of American History

_____ destroy some "myths" of American History

_____ have a better understanding of how life really was

07

_____ causes/events of Civil War & Reconstruction period

_____ settling the west

_____ the Industrial Revolution and growth of big business/labor movement

_____ US as a world power--why? how?

_____ the ability to analyze events, research, and speak to class

08

_____ historical events and how they apply to the present

_____ same sense of chronology

_____ discuss issues openly--freedom of speech

_____ behavior--social--respect for others

_____ ability to work in a group

09

____ to be able to relate the past to the present problems

____ to be able to have a good knowledge of events

____ to hopefully have students look and analysis issues in a critical manner

____ to allow student to express their views pertaining to historical situations

(only four listed)

10

____ ability to think critically

____ ability to write evaluative and interpretive essays/papers

____ a knowledge of American history

____ a familiarity with interpretations of American history

____ a positive attitude towards serious learning

11

____ be able to think clearly about issues

____ be able to write a clear answer to essay question

____ some understanding of historical background of U.S.

____ why and how U.S. is a world leader

____ ability to do a research paper for social studies class

12

____ develop a sense of organization and responsibility

____ learn to make decisions, judgement#, etc.

____ understand democratic ideology and compete it to other kinds of governments

____ knowledge of U.S. history

____ basic skills

13

____ develop an appreciation of one country's history to help them understand what is currently happening

____ develop their writing skills (answering test questions, essays, etc.)

____ develop skills such as being able to compare and contrast, looking at all sides of an issue, etc.

____ develop an understanding of the ethnic and racial diversity of our country

(only four listed)

14

____ have an appreciation of people of the past as living beings

____ have a realistic perspective of their nation's role in history

____ perceive the strengths and weaknesses in American philosophy

____ know some of what happened and why

____ not hate history (or history teachers)

15

____ improve reading skills

____ appreciation of our nations past history

____ general understanding of the changes that have taken place (for example, growth of the federal government)

____ some understanding of our political and economic system compared with other nations' systems

____ a certain amount of factual knowledge

16

____ think

____ write

____ gain conceptual knowledge of political and economic systems

____ gain conceptual knowledge of human behavior patterns

____ gain factual knowledge of US history

17

____ enjoy reading and learning about U.S. history

____ relate all aspects of the past to the present

____ relate all aspects of a single time period to each other

____ know where to find information (multi-sources) about history (i.e. art, music, books, magazines)

____ care about humanity and doing something to contribute to making this a better world

18

_____ sensitivity to the use and abuse of language (both oral and written)

_____ skill of being able to determine thesis and assumptions it is predicated upon

_____ questioning sources

_____ evaluation of the credibility of sources, i.e. frame of reference

_____ content of course, i.e. the so-called "stuff" of American history

19

_____ recall with understanding the complexities of serious themes in US history

____ demonstrate by verbal and written evaluations an understanding of US government and the democratic process--especially by reading documents

____ to write clearly and precisely in analytical fashion

____ to read a variety of points of view and be able to synthesize the material

____ to pass ETS AP exam with a high grade--since that is one reason the course was formed

20

____ a broad understanding of the development of our country

____ that we have become increasingly democratic in our country

____ that we have often confused free enterprise with democracy

____ a knowledge of some of the more important events that have taken place

____ understand the difficulty of knowing exactly what happened in the past

21

____ knowledge of democratic process

____ ability to reason

(only two listed)

A P P E N D I X H

CLASSROOM LEARNING ENVIRONMENT SCALES

CLASSROOM LEARNING ENVIRONMENT SCALES

Teacher Enthusiasm (Student Classroom Climate Questionnaire)

6. This teacher seems to like being a teacher.
11. The teacher seems to enjoy what he/she is teaching.
15. The teacher seems bored in this class.*

Verbal Clarity (Student Classroom Climate Questionnaire)

17. The teacher uses words I can understand.*
18. The teacher gives clear directions.
30. The students understand what the teacher is talking about.
33. I understand what the teacher is talking about.

Organizational Clarity (Student Classroom Climate Questionnaire)

1. We know exactly what we have to get done in this class.*
12. We know why the things we are learning in this class are important.
13. The grades or marks I get in this class help me to learn better.*
14. We don't know what the teacher is trying to get us to learn in this class.
20. Many students don't know what they're supposed to be doing during this class.
23. This class is disorganized.
24. The grades or marks I get in this class have nothing to do with what I really know.
25. We have to learn things without knowing why.
29. Students know the goals of this class.
32. Things are well planned in this class.*
34. Our teacher gives us good reasons for learning in this class.*

Classroom Materials Used in Class (Teacher and Student Classroom Climate Questionnaire Questionnaire)

textbooks
other books
worskheets*
films, filmstrips, or slides
learning kits*
games or simulations
newspapers or magazines*
tape recordings or records
television
computers*

Classroom Activities in Class (Teacher and Student Classroom Climate Questionnaire Questionnaire)

Listen to the teacher when s/he talks or demonstrates how to do something*
Go on field trips
Do research and write reports, stories, or poems*
Make maps*
Listen to student reports*
Listen to speakers who come to class*
Have class discussions*
Build or draw things
Have a debate*
Write answers to questions
Read a textbook in class*
Take tests or quizzes
Make charts or diagrams
Make films or recordings*
Conduct an interview or opinion poll
Act things out

* Low-discriminating items removed to improve scale reliability.

A P P E N D I X I

RELIABLITY FOR VARIABLE SCALES

TABLE 18

ALPHA VALUES FOR VARIABLE SCALES FOR ALL ITEMS
AND WITH LOW-DISCRIMINANT ITEMS REMOVED

Variable	Cronbach's Alpha with All Items	Cronbach's Alpha with Removal of Low-discriminating Items
Teacher Verbal Clarity	.77	.89
Teacher Organizational Clarity	-.08	-.63
Teacher Use of a Variety of Activities (st)	.20	.59
Teacher Use of a Variety of Activities (tch)	.61	.64
Teacher Use of a Variety of Materials (st)	.50	.59
Teacher Use of a Variety of Materials (tch)	.18	.54
Teacher Enthusiasm	.39	.88

A P P E N D I X J

DATA TABLES

TABLE 19

GROUP MEANS FOR ALL VARIABLES

Variable	Group Level			
	High	Average	Low	All
Time on instruction (st)	2.90	2.74	2.72	2.80
Time instruction (tch.)	8.12	8.50	8.60	8.39
Time on instruction (obs.)	.85	.84	.94	.87
Homework	1.45	1.16	.98	1.22
Students not involved	.15	.30	.12	.19
Cognitive level of goals	2.46	2.18	2.08	2.26
Affective goals	.15	.07	.30	.16
Unclear goals	.11	.17	.07	.12
Verbal clarity (st.)	1.64	1.21	1.32	1.34
Organizational clarity (st.)	27.29	27.02	26.17	26.89
What may be done in class (st.)	1.78	1.85	1.83	1.82
Teacher tells what to learn (st.)	1.66	1.71	2.07	1.79
Variety of activities (st.)	19.12	17.67	17.30	18.13
Variety of activities (tch.)	14.86	15.67	14.80	15.11
Variety of activities (obs.)	1.00	1.00	1.05	1.01
Variety of materials (st.)	8.90	9.05	8.87	8.94
Variety of materials (tch.)	9.14	7.33	8.40	8.33
Variety of materials (obs.)	.11	.10	.13	.11
Teacher enthusiasm (st.)	2.94	2.71	2.88	2.85

TABLE 20

STANDARD DEVIATIONS FOR ALL VARIABLES

Variable	Group Level			
	High	Average	Low	All
Time on instruction (st)	.16	.42	.21	.28
Time on instruction (tch.)	.69	.55	.89	.70
Time on instruction (obs.)	.16	.09	.07	.12
Homework	.36	.27	.17	.34
Students not involved	.14	.17	.06	.15
Cognitive level of goals	.56	.55	.33	.50
Affective goals	.15	.10	.28	.20
Unclear goals	.20	.20	.10	.16
Verbal clarity (st.)	1.64	1.21	1.31	1.33
Organizational clarity (st.)	1.53	.65	2.51	1.63
What may be done in class (st.)	.26	.21	.27	.23
Teacher tells what to learn (st.)	.40	.50	.56	.48
Variety of activities (st.)	2.01	1.23	2.04	1.88
Variety of activities (tch.)	1.86	3.14	1.79	2.25
Variety of activities (obs.)	0.00	0.00	.11	.06
Variety of materials (st.)	1.09	1.44	1.02	1.13
Variety of materials (tch.)	4.22	1.21	2.19	2.91
Variety of materials (obs.)	.11	.10	.13	.11
Teacher enthusiasm (st.)	2.94	2.71	2.88	2.85

A P P E N D I X K

AFFECTIVE DOMAIN GOALS

Teach Listed Goals Jugded to Be in Affective Domain

respect the opinions of others

a greater desire to read

want to become involved as citizens (give a damn)

appreciation of the value of humanities

discuss issues openly--freedom of speech

behavior--social--respect for others

ability to work in a group

a positive attitude towards serious learning

be able to write a clear answer to essay question

develop a sense of organization and responsibility

learn to make decisions, judgments, etc.

not hate history (or history teachers)

enjoy reading and learning about U.S. history

care about humanity and doing something to contribute to making this a better world

A P P E N D I X L

SUMMARY OF RESPONSES TO TEACHER QUESTIONNAIRE

SUMMARY OF RESPONSES TO TEACHER QUESTSIONNAIRE

1. Classroom time devoted to: (per cent of responses)

Daily routine	0%	14	10%	84	20%	5		
Instruction	70%	10	80%	35	90%	45	100%	10
Getting students to behave	0%	76	10%	24				

2. Expected amonut of time spent on homework (per cent of responses)

0 none
65 about half an hour
35 about one hour
0 about two hours
0 more than two hours

3. Frequency of use of classroom materials (per cent of responses

	never	not very often	often	always or most of the time
textbooks	5	14	43	33
other books	5	60	30	5
worksheets	10	43	33	14
films,film-strips, or slides	15	50	35	0
learning kits	89	11	0	0
games or simulations	65	35	0	0
newspapers or magazines	26	42	26	5
tape recordings or records	33	67	0	0
television	47	24	29	0
computers	95	5	0	0

4. Frequency of classroom activities (per cent of responses)

YES	NO	
100	0	Listen to the teacher when s/he talks or demonstrates how to do something
19	81	Go on field trips
76	14	Do research and write reports, stories, or poems
38	62	Make maps
45	55	Listen to student reports
43	57	Listen to speakers who come to class
100	0	Have class discussions
10	90	Build or draw things
52	48	Have a debate
95	5	Write answers to questions
47	53	Read a textbook in class
100	0	Take tests or quizzes
60	40	Make charts or diagrams
0	100	Make films or recordings
24	76	Conduct an interview or opinion poll
19	81	Act things out

A P P E N D I X M

SUMMARY OF RESPONSES TO STUDENT QUESTIONNAIRE

All 21 Classes

STUDENT QUESTIONNAIRE
Responses by all Classes
(in percents)

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	NO RESPONSE
1. We know exactly what we have to get done in this class.	46	44	8	2	1
2. The teacher tells us how to correct the mistakes in our work.	21	41	26	12	1
3. We are free to talk in this class about anything we want.	21	26	30	22	1
4. Students help make the rules for this class.	5	24	31	39	1
5. We are free to work with anyone we want to in this class.	14	26	28	32	1
6. This teacher seems to like being a teacher.	71	18	8	4	1
7. We can decide what we want to learn in this class.	6	20	38	46	1
8. The teacher tells me how to correct the mistakes in my work.	19	36	33	12	1
9. This teacher lets us know when we have not learned something well.	38	36	16	9	1
10. I do not have enough time to do my work for this class.	7	19	32	41	1
11. The teacher seems to enjoy what he/she is teaching.	74	19	6	1	1
12. We know why the things we are learning in this class are important.	40	39	12	9	1
13. The grades or marks I get in this class help me to learn better.	25	34	24	17	1
14. We don't know what the teacher is trying to get us to learn in this class.	4	9	26	61	1
15. The teacher seems bored in this class.	7	7	16	69	1
16. We know when we have learned things correctly.	42	41	12	3	1
17. The teacher uses words I can understand.	62	21	8	9	1
18. The teacher gives clear directions.	55	29	10	5	1
19. Some of the things the teacher wants us to learn are just too hard.	6	22	34	37	1

20. Many students don't know what they're supposed to be doing during class.	10	19	32	38
21. I have trouble reading the books and other materials in this class.	6	12	26	54
22. Students help decide what we do in this class.	6	32	30	30
23. This class is disorganized.	6	16	30	48
24. The grades or marks I get in this class have nothing to do with what I really know.	16	25	29	28
25. We have to learn things without knowing why.	6	16	30	47
26. Different students can do different things in this class.	11	17	27	43
27. Sometimes I can study or do things I am interested in even if they are different from what other students are studying or doing.	12	28	23	34
28. The teacher gives me too much work to do in this class.	7	19	37	36
29. Students know the goals of this class.	35	41	16	7
30. The students understand what the teacher is talking about.	43	41	10	5
31. I help decide what I do in this class.	11	29	39	28
32. Things are well planned in this class.	36	38	18	7
33. I understand what the teacher is talking about.	54	32	8	5
34. Our teacher gives us good reasons for learning in this class.	30	37	24	9
35. Everyone in this class knows what we may or may not do.	39	43	13	4
36. The teacher tells us ahead of time what we are going to be learning about.	52	27	10	9

37. In this class, how much time is usually taken by the following 3 things?

Mark the circle under the word "most" for the thing that takes the most time.

Mark the circle under the words "Next Most" for the thing that takes the next most time.

Mark the circle under the word "Least" for the thing that takes the least amount of time.

	LEAST	NEXT MOST	MOST	NO RESPONSE
1. Daily routines (passing out materials, taking attendance, making announcements)	33	60	6	1
2. Learning	3	12	84	1
3. Getting students to behave	63	25	8	5

38. On the average, how much time do you spend on homework a day?

PER CENT OF RESPONSES

19	none
51	about half an hour
23	about one hour
4	about two hours
2	more than two hours
1	no response

39. Which of the following things are used in your history class as part of your lessons? Mark the YES circle if you have used the material in your class mark the NO circle if you have not used it.

YES	NO	NO RESPONSE	
92	7	1	Textbooks
54	46	1	Other books
80	20	1	Work sheets
70	29	1	Films, filmstrips, or slides
3	95	2	Learning kits
27	72	1	Games or simulations
49	50	1	Newspapers or magazines
29	70	1	Tape recordings or records
45	54	1	Television
1	98	1	Computers

40. Which of the following activities have you done in your history class? Mark the YES circle if you have done the activity in class; mark the NO circle if you have not done it. .

YES	NO	NO RESPONSE	
89	9	2	Listen to the teacher when s/he talks or demonstrates how to do something
6	92	2	Go on field trips
75	23	2	Do research and write reports, stories, or poems
44	54	2	Make maps
27	71	3	Listen to student reports
55	43	2	Listen to speakers who come to class
90	8	2	Have class discussions
10	87	2	Build or draw things
52	46	2	Have a debate
86	12	2	Write answers to questions
71	27	2	Read a textbook in class
97	1	2	Take tests or quizzes
32	66	2	Make charts or diagrams
2	96	2	Make films or recordings
12	86	2	Conduct an interview or opinion poll
17	80	2	Act things out

R E F E R E N C E S

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