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Teams, Games, Tournament–A Classroom Management System: A Study of its Impact on Socialization and Academic Performance in a Multicultural Environment

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TEAMS, GAMES, TOURNAMENT - A CLASSROOM MANAGEMENT SYSTEM: A STUDY OF ITS IMPACT ON SOCIALIZATION AND ACADEMIC PERFORMANCE IN A MULTICULTURAL ENVIRONMENT

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CHAPTER I

INTRODUCTION

The national goal of American public education is universal education. Therefore "no individual or group, for any reason whatsoever, is to be barred from equal access to standard opportunities."[1] Since 1954 and Brown vs Board of Education, the United States Supreme Court has declared that this national goal can only be and must pursued in desegregated schools.

The legal activism that has followed since Brown has forced our society and our schools to redefine American culture. "Our schools... have long been operated on the assumption that there is a single American culture."[2] This myopic view of our national character was easily reinforced by the neighborhood school concept. Within a given school, the students came from a common neighborhood. They shared a common ethnic, racial, and social heritage with a clearly defined and generally accepted class structure. The neighborhood values became the values of the school. With marvelous shortsightedness, the school provided its patrons with equal access to a universal education, as defined by the limits of the surrounding neighborhood.

There was no questioning of "equal" or "universal" because each neighborhood served as its own universe. Neighborhoods were self-contained. They not only had their own schools, but their own residential and commercial districts. Citizens could be born, educated, work and die all within a self-contained setting of common heritage, goals and expectations.

This social myopia was a denial of historical facts. Between 1880 and 1920, approximately thirty to forty million people of Eastern and

Southern European origins entered this country.[3] America saw a doubling of its population during this period, but it did not recognize its cultural pluralism, because "as cities became larger, people increasingly tended to segregate themselves."[4] This metropolitan social segregation coincided with school stratification. The character of the neighborhood determined the character of the schools, and "it was claimed that white ethnics of Eastern and Southern European origins were genetically inferior in intelligence since their IQ scores were ten to fifteen points below that of native-born WASPS."[5] The school's role in all of this was to impose an "Anglo-centric curriculum," outlaw the use of European language, and deny the value of the cultural heritage of the new immigrants.

For those that would argue that this did help to achieve a monocultural melting pot, it is only necessary to point to the many ethnic festivals that take place in large urban centers such as Omaha with its Black Heritage Week, Santa Lucia Festival, annual Greek festivities, celebration of the Chinese New Year, and the city-wide celebration of its many other ethnic groups.

As this society has moved towards a true recognition of its own character, both educational philosophy and the classroom environment have undergone change. Social mobility, brought about by the automobile and television, has put an end to the insular, self-perpetrating ethnic/class neighborhood. An individual or group can no longer be isolated from an awareness of differences between his or her position in society and the benefits that belong to others. Expectations are no longer determined by ignorance of the society as a whole. Mass mobility and mass communication have put an end to segregation created and promulgated by a policy of social ignorance.

As awareness has led to increased expectations, ethnic and minority groups have turned to the schools to provide the means necessary to gain their fair share of what America has to offer. At the same time, the "highly ethnically-conscious movements by blacks and other minorities" have clearly demonstrated an unwillingness to deny or rescind the many positive attributes of their own cultures.[7]

Thus, the school population of today is vastly different than either that of the 1950's or the 1920's. Classrooms are not homogenous environments determined by the local neighborhood. They are heterogenous, reflecting the make up of the total setting. Students do not share common goals or expectations limited by social exposure. Nor can schools impose standards and expectations based upon a predetermined view of a group's role in society. Students will no longer accept a denial or abridgement of the worth of their cultural heritage. Schools can no longer impose either a majority or monocultural heritage upon their diverse patrons.

"Universal education" and "equal access" have taken on entirely new meanings. All students must have an equal opportunity to achieve their full potential regardless of their current or historical role in American society. This must also be achieved in an environment of social desegregation instead of social isolation. At the same time the schools must help all students to recognize the innate values of America's varied cultural and ethnic groups. To deny the importance of this social education leads to a denial of both universal education and equal access.

Individual classroom teachers must now be able to take a diverse student population and create an environment that promotes academic excellence for all, a recognition of self worth, and an appreciation of the value and heritage of others with differing backgrounds.

Team learning has been evaluated as a method that will create the necessary classroom environment. It "is supported by a long tradition of research indicating that persons placed in a cooperative reward structure,...come to like and help one another more" than students who do not learn in a group setting.[8] Team techniques have also been shown to have positive effects on self esteem and academic performance.[9]

This study will focus on one team learning technique: Teams, Games, Tournament, developed by the Johns Hopkins University Center for Social Organization of Schools. In the Teams, Games, Tournament (TGT) process, students work in four or five member teams. The teams are organized by the teacher to reflect the social and academic make-up of the class. Thus, if a class is half black and half white, each team will have corresponding representation. The male/female balance of each team is determined in a like manner. On each four-member team there is one student of high ability, two students of average ability, and one student of low ability.

The instructional process involves the teacher in presenting the lesson to the class, the teams in reviewing the material through peer instruction, and finally, tournament competition with other students of equal ability from different teams. In the three member tournaments, students compete for either two, four, or six points to take back to their team total.[10]

This system provides for a great deal of social interaction based on mutual goals, trust, and the varying abilities and backgrounds of the students. Since each team is equal in ability, each team has an equal chance at success or failure, depending on the team members' ability to

assist one another through positive social interaction. The tournament structure allows each student to compete at his or her maximum level of performance against students of similar ability. It requires maximum performance on the part of each student if that individual is to contribute to the team score. Winning teams, not individuals, receive recognition through a special class bulletin board and a school newsletter. This system provides social, academic, and self concept rewards for learning that are not usually provided for in the structure of the traditional classroom.

Research on TGT has shown positive academic growth for students, development of mutual concern and peer support, and improvement in self concept.

In review of ten research experiments involving TGT and academic performance the following summary is offered:

> of the eleven different treatment-specific tests of TGT effects made across the ten experiments, eight were significant at the .05 level, one was significant at the .10 level, and two tests...were nonsignificant.[11]

The three tests showing marginal or no effect all involved social studies. The studies reporting the positive effects of TGT involved math and a variety of language skills in the areas of language arts and reading.[12]

Eight of the tests used standardized measures. TGT was shown to have a positive effect on five of those tests. On the remaining three standardized tests, there were no significant differences between TGT and the control group.[13]

Test results measuring student attitude are inconsistent. Student attitude was measured using one or both of the following measures:

the satisfaction scale from the Learning Environment Inventory and an Attitudes Toward the Class scale. Out of nine different studies measuring student attitude, the TGT was shown to have positive effects in four of the studies. In the remaining five studies, no significant effects were noted for TGT.[14]

Because of TGT's academic and social applications, Druid Hill Elementary School was chosen as the site for the experimental group in this study. Students volunteer to attend Druid Hill because of its special emphasis on math and science. They come from approximately fifty different schools from throughout the Omaha Public School District. They reflect a wide range of academic performance (from gifted to special education), ethnic background (black, white, Asian, Hispanic, and Indian), and socioeconomic backgrounds. (Out of a total enrollment of 477 students, 228 qualify for the free lunch program and 50 for reduced lunch.) It is truly an urban school which reflects the cosmopolitan make up of the city. The school and the program are well mated for the purpose of this study.

STATEMENT OF PURPOSE

The purpose of this study is to access the impace of TGT at the fifth grade level in four areas.

Hypothesis 1: It is hypothesized that there is no significant difference between children in the Druid Hill TGT program and children in the control group in academic achievement.

Hypothesis 2: It is hypothesized that there is no significant difference between children in the Druid Hill TGT program and

children in the control group in attitude toward school.

Hypothesis 3: It is hypothesized that there is no significant difference between children in the Druid Hill TGT program and children in the control group in self-concept.

Hypothesis 4: It is hypothesized that there is no significant difference between children in the Druid Hill TGT program and children in the control group in cultural awareness.

PROCEDURES

Hypothesis 1: It is hypothesized that there is no significant difference between children in the Druid Hill TGT program and children in the control group program in academic achievement.

1. The experimental group at Druid Hill is composed of all students registered in the fifth grade.
2. Fifth grade students from Dundee School were selected as the control group in order to measure academic achievement. They were selected because of comparability of academic performance, socioeconomic factors, and access to computers as part of the curriculum.
3. The April, 1981 California Achievement Test scores in mathematics were selected for the pre-test data. Specific subsections include concept attainment and computations.
4. A post test of the California Achievement Test (math concept attainment and computations) will be administered in January, 1982.
5. A "T" score will be used to test for significance in academic achievement in math concept attainment and computations.

Hypothesis 2: It is hypothesized that there is no significant difference between children in the Druid Hill TGT program and children in the control group in attitude toward school.

1. All students in the Druid Hill fifth grade class constitute the experimental group.
2. The Student Attitude Questionnaire - Human Community Relations of the Omaha Public Schools was selected as the device for measuring attitude toward school.
3. The Omaha Public Schools fifth-grade norm shall constitute the control group.
4. A pretest was administered to the experimental group in September, 1981.
5. A post test will be administered in January, 1982.
6. A "T" score will be used to test for significant differences in attitude toward school.

Hypothesis 3: It is hypothesized that there is no significant difference between children in the Druid Hill TGT program and children in the control group in self-concept.

1. All procedures will be the same as for Hypothesis number two.

Hypothesis 4: It is hypothesized that there is no significant difference between children in the Druid Hill TGT program and children in the control group program in cultural awareness.

1. All procedures will be same as for the second hypothesis.

DEFINITION OF TERMS

Student Team Learning - a set of instructional techniques developed at the Center for Social Organization at The Johns Hopkins University. The process incorporates teacher instruction, small carefully structured learning teams and a specific reward structure for academic achievement.

Teams, Games, Tournament (TGT) - one of several specific programs included in Student Team Learning. It has been previously described in this chapter, pages 4-6.

LIMITATIONS OF THE STUDY

This study is limited to the sample in Omaha Public Schools to the extent that Druid Hill and Dundee are representative of the metropolitan area.

ASSUMPTIONS

It is assumed that the California Achievement Test and Student Achievement Attitude Questionnaire - Human-Community Relations are representative and accurately reflect the performance and attitudes of the students.

It is also assumed that the teachers who are part of the Druid Hill experimental group have accurately incorporated the TGT process with their curriculum. This assumption is based on teacher participation in a TGT inservice program and extended observation by a Johns Hopkins certified trainer.

ORGANIZATION OF THE STUDY

This study is organized into five chapters. Chapter One is a general introduction. Chapter Two will offer a review of related literature. Chapter Three will present the methodology used in conducting this study. Chapter Four will report the findings of the study. Summary and conclusions will be presented in Chapter Five.

NOTES

[1]Ruth Landes, Culture in American Education (New York: John Wiley and Sons, Inc., 1965) p. 99.

[2]Milton J. Gold, Carl A. Grant, Harry N. Rivlin, Eds., In Praise of Diversity: A Resource Book for Multicultural Education (Washington D.C.: Multicultural Education Publications, Teacher Corps, Association of Teacher Educators, 1977) p. 18.

[3]Bob Suzuki, "Multicultural Education: What's it all About?" Integrated Education, Jan.-April, 1979, p. 43.

[4]R. Murraz Thomas, Social Differences in the Classroom (New York: David McKay Company, Inc., 1965) p. 19.

[5]Suzuki, op. cit., p. 44.

[6]Ibid.

[7]Ibid.

[8]Student Team Learning: Introductory Brochure (Baltimore: The Johns Hopkins University Center for Social Organization of Schools, N.D.).

[9]Robert Slavin, Using Student Team Learning (Baltimore: The Johns Hopkins University, Team Learning Project, Center for Social Organization of Schools, 1980) pp. 8-9.

[10]Ibid.

[11]David L. DeVries and Robert E. Slavin, Teams, Games, Tournament: A Final Report on the Research, Report No. 217 (Baltimore: The Johns Hopkins University Center for Social Organization of Schools, 1976) p. 51.

[12]Ibid., p. 50.

[13]Ibid., p. 52.

[14]Ibid.

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Ruth Landes, Culture in American Education. New York: John Wiley and Sons, Inc., 1965.

Robert Slavin, Using Student Team Learning. Baltimore: The Johns Hopkins University, Team Learning Project, Center for Social Organization of Schools, 1980.

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R. Murray Thomas, Social Differences in the Classroom. New York: David McKay Company, Inc., 1965.

CHAPTER II

REVIEW OF RELATED LITERATURE

Teams, Games, Tournament (TGT) is one of several educational programs collectively known as Student Team Learning (STL). Jigsaw and Student Teams-Achievement Divisions (STAD) are the other major components of STL. There are other variations. None of the components of TGT or the other STL programs were developed in isolation. As a result, any research review must include TGT, the other components of STL and still other team or cooperative learning programs.

Traditionally, scholastic research on classroom and curriculum management programs studies only the academic impact of those programs. However, there is research that suggests schools must also examine the social impact of the learning environment. An overview of this social impact research serves as a relevant introduction since TGT may offer significant gains in the traditional area of academic performance and in the emerging field of social impact.

The classroom has a social impact in several areas of child development. Some of these areas include self-concept, interpersonal relationships, and racial and cultural awareness. Children do not automatically develop positive attitudes and skills in these areas of social impact. As in the academic areas, there is a need for specific social skill training. There must also be the opportunity to practice and develop those skills. Such training and experience can result in significant gains in peer acceptance.[1] This ability to work with others has been identified as a key factor leading to success as an adult.[2] Conversely,

peer isolation and rejection may lead to dropouts, delinquency and other mental health problems.[3]

There are factors which generally offer opportunities for positive social development. Small group learning (which is a component of TGT), emphasizing interpersonal interaction has been suggested as a direct technique for improving socialization.[4] A reward structure (another component of TGT), has also been identified as an important adjunct to forming positive interpersonal attitudes.[5]

Training in socialization, when undertaken in a systematic manner, appears to have not only a beneficial effect but also a lasting effect.[6]

TGT has been found to increase peer attraction among junior high students. In a five month follow-up of those students, greater peer interaction was still being maintained. These results are of special interest. Although the junior high students involved in the study were of normal intelligence, they had all been identified as having problems with academic tasks, human relationships and/or self-organization.[7]

Elliot Aronson and a group of researchers conducted a study of interdependent learning teams at the fifth grade level. This was an interracial setting. Team participants gained in self-esteem as compared to the students in the control group. Black and Anglo students also increased their liking for school more than students in the control group.[8]

Johnson and Johnson, another team of researchers long active in cooperative learning, studied student behavior and performance in teams as compared to individualized programs. In language arts at the fifth

grade level, participants had more positive attitudes toward learning. Team participants also had greater achievement than those students involved in the individualized program.[9]

The social development that results from cooperative learning has also been shown to break down traditional racial/social barriers. Slavin has investigated the social applications of team learning in desegregated schools. He found that both the number and proportion of students with cross-racial friendships increased when students learn in teams using the STAD process. This longitudinal study also showed that the gains in cross-racial friendships were maintained over time.[10]

Cooperative team learning techniques have also been studied for their impact on the more traditional focus on schools: academic success. A number of investigators have found positive results. However, these results have not been consistent for all programs, subject areas or grade levels.

Slavin and DeVries have investigated a wide range of cooperative learning experiences. They note that "evidence concerning the effects of cooperative task and reward structures on academic achievement is not conclusive." However, continuing in their analysis, they reached the conclusion that "TGT has consistent effects on achievement."[12] These observations were made only after reviewing studies which involved over 3,000 students in grades 3-12 in urban and suburban settings.[13]

Aronson studied the use of Jigsaw at the fifth and sixth grade levels. He found that students in interdependent classes has "superior performance." This was especially true for minority students. Growth in academic achievement was consistent across the range of students'

performance. High ability students were found to benefit from the Jigsaw method just as much as low ability students.[14]

In a study of ten TGT applications, TGT was found to have "relatively consistent positive results."[15] The ten applications were used in a variety of settings, including urban and suburban schools. The majority of the uses of TGT were in language arts and mathematics. TGT's application to social studies, verbal analogies and reading vocabulary was also studied.

In four out of six studies STAD has also exceeded control groups in increasing learning.[16] Like TGT, a variety of subject areas and settings were involved.

In summarizing twenty-eight major studies (see Table I), Slavin notes that cooperative learning has "unquestionably positive" results in a variety of social growth areas.[17] Academic achievement is seen as less consistent.[18]

Obviously, Table I does reveal that all of the research studies on TGT and other cooperative learning strategies have not yielded consistent resutls. A review of the literature discloses that attempts have been made to identify the reasons for inconsistent findings. Attempts have also been made to determine those factors that contribute to successful cooperative learning programs.

Petrehene makes the observation that small groups should be balanced academically.[20] There is also a need for group participants to have a sense of organization and structure.[21] All of the STL programs do incorporate teams that are balanced academically. There are also parameters for the racial/social balance of teams. A formal structure of team

Table I*

Effects of Cooperative Learning Techniques on Learning, Race Relations, and Mutual Concern

Study Number	Subject Area	Academic Achievement: Curriculum-Specific Test	Academic Achievement: Standardized test	Race Relations	Mutual Concern
	TGT				
1	Mathematics	+	+	+	
2	Mathematics	+		0	+
3a	Mathematics	+		+	+
3b	Social Studies	0			
4	Mathematics		+		
5	Social Studies	+	0	+	+
6	Language Arts	+	+		0
7	Language Arts	+	+		0
8a	Reading Vocabulary	+			
8b	Verbal Analogies	+			
9	Language Arts	+	0		+
10	Social Studies	0	0		+
	STAD				
11	Language Arts	0	0		+
12	Language Arts	+	+	+	0
13	Language Arts	+	+		+
14	Language Arts	0	0	+	+
15	Language Arts	0	+	+	0
16	Mathematics	+			
	Jigsaw				
17	Social Studies	0			
18	Social Studies	+			
19	Social Studies			+	
	Combined Program				
20a	Mathematics		0		+
20b	Language Arts (STAD)		+		
20c	Social Studies (Jigsaw II)		0		
20d	Reading (Jigsaw II or STAD)		+		
	Small-group Teaching				
21	Social Studies				
21a	(a) Grade 2	+			
21b	(b) Grade 3	0			
21c	(c) Grade 4	+			
21d	(d) Grade 5	0			
21e	(e) Grade 6	+			

Table I (continued)

	Other Studies			
22	Language Arts	0		
23	Mathematics	-		
24	Science, English, Geography		+	+
25	Social Studies	0		
26	Social Studies	+		
27	English		+	
28	Spelling, Mathematics, Reading	+		

Note: + = statistically significant effect favoring experimental group, 0 = no difference, - = statistically significantly favoring control group.

*Robert E. Slavin, "Cooperative Learning," Review of Educational Research, Summer, 1980, p. 237.

operation is provided. Students are helped to develop a sense of organization.

Victor and Halverson have written that teachers can influence peer relationships among students.[22] They refer to a study by Nash (1973) that further identifies how student relationships are affected by teacher attitudes and overt teacher behaviors.[23] TGT and the other STL programs do require changes in teacher attitudes and behavior in order to implement team learning.

Sharan has reviewed a wide range of cooperative learning programs. He, too, has endeavored to isolate those factors that account for positive team learning results. Sharan regards both the team reward system and the format of instructional activities as the key factors that account for achievement gains with TGT and STAD.[24]

The numerous studies on cooperative learning do not all share common experimental design characteristics. These differences in design may account for discrepancies in results.[25]

Slavin, independent of Sharan, has also undertaken to identify the salient characteristics of team learning that yield positive results. He points to the system of instruction and the team reward concept as adding to the success of students using TGT and STAD. Slavin also adds the team task structure as a course of beneficial results. The task structure requires the students to work in pairs on specific material. The students are also required to check each others work.

Slavin also notes that the various cooperative learning techniques have differing components in the areas of "reward interdependence, task interdependence, individual accountability, teacher accountability and

use or nonuse of group competition."[27] The implication is that the interplay between these diverse factors affects both the academic and social outcomes of the various team learning programs.

Academic and social outcomes are tied together in the classroom. Learning does not take place without socialization and socialization does not occur without learning. The object of this study is to examine the academic and social impact of TGT in a multicultural elementary school setting.

The school setting, Druid Hill, is the first elementary magnet school in Omaha Public Schools. The social and academic outcomes of its first year of operation will have significance for the total school system.

FOOTNOTES

[1]Gary W. Ladd, "Effectiveness of a Social Learning Method for Enhancing Children's Social Interaction and Peer Acceptance," Child Development.

[2]Patricia Cross, Accent on Learning (San Francisco: Jossey-Bass, Inc., 1976) p. 5.

[3]Ladd, op.cit.,

[4]Cross, op.cit., p. 170.

[5]Thomas J. Caulfield, "The Successful Ones," The Personnel and Guidance Journal, Dec., 1980, p. 241

[6]Ladd, op.cit., p. 177.

[7]Robert E. Slavin, "A Student Team Approach to Teaching Adolescents with Special Emotional and Behavioral Needs," Psychology in the Schools, Vol. 14, #1, 1977, pp. 77-79.

[8]Nancy T. Blanez, Cookie Stephan, David Rosenfield, Elliot Aronson and Jev Sikes, "Interdependence in the Classroom," Journal of Educational Psychology, April, 1977, p. 121.

[9]David W. Johnson, Roger T. Johnson, Jeanette Johnson and Douglas Anderson, "Effects of Cooperative v. Individualized Instruction on Student Prosocial Behavior," Journal of Educational Psychology, Vol. 68, #4, 1976, p. 446.

[10]Robert E. Slavin, "Effects of Biracial Learning Teams on Cross-Racial Friendships," Journal of Educational Psychology, June, 1979, p. 386.

[11]Herbert J. Walberg, Educational Environments and Effects (Berkley, Calif.: McCutchan Publishing Corp., 1979) p. 122.

[12]Ibid

[13]Walberg, op.cit., p. 125.

[14]G. William Lucker, Davind Rosenfield, Jev Sikes and Elliot Aronson, "Performance in the Interdependent Classroom: A Field Study," American Educational Research Journal, Spring, 1976, pp. 120-121.

[15]Robert E. Slavin, "Cooperative Learning," Review of Educational Research, Summer, 1980, p. 328.

[16]Slavin, op.cit., p. 329.

[17]Slavin, op.cit., p. 333.

[18]Ibid

[19]Slavin, op.cit., p. 324-325.

[20]Susan B. Petreshene, The Complete Guide to Learning Centers (Palo Alto, California: Pendragon House, 1978) p. 16.

[21]Petreshene, op.cit., p. 18.

[22]James B. Victor and Charles F. Halverson, Jr., "Children's Friendship Choices: Effects of School Behavior," Psychology in the Schools, Vol. 17, no. 3, p. 413.

[23]Victor, op.cit., p. 409.

[24]Shlomo Sharan, "Cooperative Learning in Small Groups: Recent Methods and Effects on Achievement, Attitudes and Ethnic Relations," Review of Educational Research, Summer, 1980, p. 248.

[25]Slavin, "Cooperative Learning," p. 334.

[26]Slavin, "Cooperative Learning," p. 335.

[27]Slavin, "Cooperative Learning," p. 321.

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CHAPTER III

METHODOLOGY

GENERAL BACKGROUND

Druid Hill elementary school was selected as the site for the experimental group in this study. Four fifth grade classrooms composed the experimental group. Data representing 93 students are included in this field project. This is less than the total number of students enrolled in the fifth grade. Students who were not present for both pre- and post testing were not included.

Druid Hill serves as a neighborhood school for Kindergarten through third grade. The neighborhood is an urban low socioeconomic area that is predominantly black. The school offers a traditional primary curriculum similar to other schools within the public school systems.

Grades four, five, and six serve as a math and science center for the total metropolitan area. Students in these grades attend Druid Hill on a voluntary basis. They come from all geographic areas of the city. These students represent many socioeconomic levels, racial and ethnic groups. Omaha Public Schools reports that in grades four, five and six Druid Hill is 51.8% black and 48.2% non-black.

Any student in the Omaha Public Schools intermediate grades who has an interest in math and/or science may request to attend Druid Hill. A student's level of academic performance is not taken into account. Since the number of students requesting to attend Druid Hill exceeds the opening available, final selection of students is made by a lottery. As a result, students with a wide range of academic and social skills do

attend the school. The only element the students have in common is that they (or their parents) have expressed an interest in the special math and science programs that are available at the school.

Students attend the school for a full day and participate in all subject areas and activities that are normally associated with an elementary school. However, math and science programs are expanded and include access to a science lab and computer lab. Each lab has one full time subject area specialist who works with the students and the teachers.

The students attend the labs on a regularly scheduled basis as a supplement to the normal classroom instruction. Normal classroom instruction in mathematics takes 40 to 45 minutes of each school day. Students spend an additional 90 minutes a week in the math lab. In the lab, students use calculators and computers. Of the 90 minutes allotted, each student spends 50 minutes a week actually working with computers and calculators. Individual computers are available for classroom use an additional 60-90 minutes a week. The classroom use of computers is totally at teacher discretion.

Members of the school's teaching staff were carefully screened and personally selected by the principal for assignment to the building. Final assignment was made only with teacher consent.

TGT was fully incorporated for use with regular classroom instruction in the basic skill areas of mathematics. Areas of use include addition, subtraction, division, multiplication, whole numbers, fractions and decimals.

The integration of TGT with regular classroom instruction was accomplished in several stages. Prior to the opening of the school year,

staff attended a general awareness session about team learning. They were presented with an overview of the different components of Student Team Learning. After discussion, the staff elected to use TGT.

Continuing during the summer months, the staff worked to refine the scope and sequence of their mathematic's curriculum. A copy of the fifth grade scope and sequence is included in Appendix B. Part of this work included developing the team practice sheets and tournament game sheets that would be used by the students and teachers. Samples of these materials are contained in Appendix C. This work was coordinated by two individuals from the school district: a math supervisor and a Johns Hopkins certified Student Team Learning Teacher.

As the school year began, staff were trained in the classroom organization of TGT. This was accomplished through a formal inservice program. This inservice was based on the methodology set forth in the Johns Hopkins Student Team Learning teacher's manual. The certified trainer aided school staff in actual classroom implementation and monitored the use of TGT throughout the course of this study.

Teachers, as a group, met regularly with the TGT trainer in order to share and engage in problem solving discussions. Upon teacher request, the trainer also held individual conferences.

There was regular schedule for classroom use of the TGT process. This schedule included the normal sequence of teacher directed instruction, team practice and tournament competition. At least two days a week were used for team practice. Tournaments were used as the closing activity for each unit of instruction. Depending on the length of each unit, formal tournaments were held every two to four weeks. During the

longer units, practice tournaments were occasionally used.

At the end of each unit appropriate recognition was given to winning teams. Classroom teachers posted winners and team standings on special TGT bulletin board. The school newspaper was also used to announce the winning teams of individual classrooms.

SPECIFIC METHODOLOGY

Hypothesis 1: It is hypothesized that there is no significant difference between children in the Druid Hill TGT program and children in the school control group in academic achievement.

The experimental group was composed of all fifth grade students at Druid Hill who were present for both pre- and post testing. Dundee elementary school had been selected as the site for the control group. However, there were administrative factors beyond the control of this researcher. As a result, no data were available from Dundee. The national norms for the California Achievement Test served as the control group.

The April, 1981 California Achievement Test scores in concept attainment and computation were used for pretest data. Post testing took place in April, 1982.

Pre and post test means were figured. Scale score differences were computed. A "T" score was used to test for significance in academic achievement in math concept attainment and computations.

Attitude toward mathematics was also evaluated at Druid Hill. A device developed by Omaha Public Schools was used. The Attitude toward Mathematics questionnaire has been validated and a district norm has been

established. Appendix D includes a copy of the questionnaire.

Pre and post test mean scores were figured for Druid Hill fifth grades. These scores were compared to the school district's norm. A "T" score was used to test for significance. The pre test was administered in September, 1981. The post test was administered in January, 1982.

Hypothesis 2: It is hypothesized that there is no significant difference between children in the Druid Hill TGT program and children in the control group in attitude toward school.

Hypothesis 3: It is hypothesized that there is no significant difference between children in the Druid Hill TGT program and children in the control group in self-concept.

Hypothesis 4: It is hypothesized that there is no significant difference between children in the Druid Hill TGT program and children in the control group in cultural awareness.

Hypotheses two, three and four shared a common methodology. The Druid Hill fifth grade served as the experimental group. As previously noted, population consisted of 93 students and 4 teachers.

All three hypotheses are tested using an instrument known as the Student Attitude Questionnaire (SAQ). A copy of this questionnaire is included in Appendix E. The questionnaire reports three scores: self-concept, attitude towards school and cultural awareness.

The SAQ was developed and validated by Omaha Public Schools. A district norm has been established for the device. That norm serves as the control group in this study.

As with all other devices used in this field project, the SAQ was group administered for the pre test and the post test. The pre test was

administered to the experimental group in September, 1981. The post test was computed in January, 1982. Mean scores and standard deviations were computed for all sub-categories for the experimental and control groups. This was done for all grade levels reviewed in this paper. A "T" score was used to test for significant differences.

Additional data were gathered for use by Omaha Public Schools. This data includes California Achievement Test scores and Student Attitude Questionnaire scores for fourth and sixth grade. The data used in this study and the additional data are included in Instructional Research Report #1981-7. A copy of the research report is included in Appendix F.

CHAPTER IV

FINDINGS OF THIS STUDY

INTRODUCTION

This study was undertaken in order to examine the impact of Teams-Games-Tournament on academic achievement in mathematics and student attitudes. The study was specifically targeted at the fifth grade. Druid Hill served as the site for the experimental group. The national norms of the California Achievement Test served as the control group for academic achievement in mathematics. The local norms of the Omaha Public Schools served as the control group in the areas involving student attitudes. "T" scores were used to test for significant differences in all areas.

Hypothesis 1: It is hypothesized that there is no significant difference between children in the Druid Hill TGT program and children in the control group program in academic achievement.

Table II

5th Grade Achievement in Mathematics (Scale Scores)
California Achievement Test

SUB-TEST	Pre Test			Post Test		
	Norm	Druid Hill	Diff.	Norm	Druid Hill	Diff.
Computations	415	429	+14	453	488	+35*
Concepts & Applications	437	452	+15	467	490	+27*

*$p \leq .001$

Table II shows the mathematics achievement of students at Druid Hill compared to the norm group. The achievement scores that are shown are scale scores. At the time of pre-testing, Druid Hill students were already ahead of their national counterparts. However, a "T" test revealed

that the difference was not significant.

By the time of post-testing, Druid Hill students had improved their standings in comparison to the norm group in both of the areas that were measured by the sub-tests of the California Achievement Test. A "T" score revealed that the difference at the time of post-testing was significant ($p \leq .001$).

Table III

5th Grade Achievement in Mathematics (Grade Equivalencies)
California Achievement Test

SUB-TEST	Pre Test			Post Test		
	Norm	Druid Hill	Diff.	Norm	Druid Hill	Diff.
Computations	4.6	5.0	+.4	5.6	6.6	+1.0*
Concepts & Applications	4.6	5.1	+.5	5.6	6.5	+ .9*

*$p \leq .001$

Table III also presents the mathematics achievement of students at Druid Hill compared to the norm group. Grade equivalency scores are used to demonstrate growth. As expected, the norm group shows growth of one academic year in both computation and concepts and attainment. The Druid Hill group shows a total academic growth of 1.6 years in computation. The academic growth for Druid Hill students in concepts and applications represents 1.4 years. Naturally, the level of significance for the data in Table III is the same as the level of significance for the data in Table II.

Table IV

Fifth Grade
Attitudes Toward Mathematics

Pre Test		Post Test	
Norm Group	Druid Hill	Norm Group	Druid Hill
13.8	15.3*	13.5	16.0*

*$p \leq .001$

Table IV shows student attitude toward mathematics. Druid Hill students are compared to the district-wide grade level norm for Omaha Public Schools. The attitude toward mathematics of Druid Hill students was significantly ($p \leq .001$) above the district norm for both the pre and post tests. Two trends should be noted. The trend for the district, at all grade levels, is for student attitudes to decline the longer a child is in school. That trend is indicated here in the scores for the norm group. The scores for Druid Hill go against the district trend. Instead of decreasing, student attitude continues to improve. A score of 16.0 is considered very high. The maximum score possible is 20. There is no interpretation for "good" or "bad" scores. Students and schools simply place above or below the district norm.

Hypothesis 2: It is hypothesized that there is no significant difference between children in the Druid Hill TGT program and children in the control group in attitude toward school.

Table V

Fifth Grade Attitude Toward School
Student Attitude Questionnaire

Norm Group	Druid Hill Pre-Test	Druid Hill Post-Test
22.5	22.9	22.3

Table V exhibits scores demonstrating student attitude toward school. Druid Hill students are compared to the district-wide grade level norm for Omaha Public Schools. The attitude score for the district is normed only once per grade level. As a result, a pre and post test score is not available for the district norm, which represents the control group.

There is a general pattern which shows that the norm score falls the

longer a child is in school. The district norm for this subject is 23.1 at the fourth grade, 22.5 at the fifth grade and 22.1 at the sixth grade.

The Druid Hill mean started out .4 above the norm. By the time post testing was completed, the Druid Hill mean score had fallen .6 and was .2 below the district norm mean score. This seems to follow the same pattern as the year-to-year norm scores for the district.

A "T" test was done on pre and post test scores in comparison to the district norm. No level of significant difference was found. Statistically, the Druid Hill students stayed the same in attitude toward school and were comparable to the district norm.

Hypothesis 3: It is hypothesized that there is no significant difference between children in the Druid Hill TGT program and children in the control group in self-concept.

Table VI

5th Grade Attitude Toward Self
Student Attitude Questionnaire

Norm Group	Druid Hill Pre Test	Druid Hill Post Test
32.7	33.6	32.5

Table VI displays scores reflecting student attitude toward self. Druid Hill students are compared to the district-wide grade level norm for Omaha Public Schools. The norm score for the district is static. An actual pre and post test district norm score is not available. The trend, when norms are compared from grade level to grade level shows a decline in student attitudes. As an example, the static norm score for fourth grade is 33.3 Thus there is a .6 decline in raw scores between fourth and fifth grade.

Druid Hill began the school year with a score .9 above the district norm. During the course of this field project the Druid Hill mean score fell 1.1 points. The post test Druid Hill mean was .2 below the norm. This trend is similar to the overall pattern for the school district in which attitude scores drop corresponding to the longer a child is in school.

A "T" test was done on pre and post test scores in comparison to the district norm. No level of significant difference was found. Statistically, the Druid Hill students stayed the same in attitude toward self and were comparable to the norm.

Hypothesis 4: It is hypothesized that there is no significant difference between children in the Druid Hill TGT program and children in the control group in cultural awareness.

Table VII

5th Grade Cultural Awareness
Student Attitude Questionnaire

Norm Group	Druid Hill Pre-Test	Druid Hill Post-Test
25.7	26.2	27.1*

*$p < .01$

Table VII displays scores that show student levels of cultural awareness. The students' level of cultural awareness can be taken as a reflection of the student attitude towards cultures different than his or her own.

The mean score for Druid Hill students is compared with the mean score for the school district. As with the scores from the other components of the Student Attitude Questionnaire, it is not possible to reach conclusions about "positive" or "negative" attitudes. Rather, students

are simply above or below the norm for Omaha Public Schools.

In the case of Druid Hill, the fifth grade students started out .5 above the norm. During the course of this study, their mean score continued to increase. By the time of the post test, the Druid Hill fifth grade students were 1.4 points above, the district norm.

A "T" score was used to test for levels of significance. There was no significant difference between the Druid Hill students and the school district norm at the time of the pre test. The difference between the Druid Hill post test mean and the norm for Omaha Public Schools was significant ($p \leq .01$).

SUMMARY

In three out of the six measurements used, the Druid Hill group scored significantly better than the control group. This occurred in computation skills, measured by the California Achievement Test; concepts and applications, also measured by the California Achievement Test; and cultural awareness, as determined by the Student Attitude Questionnaire.

In the area of attitude toward mathematics, scores of Druid Hill students showed a gain, while the scores of the control group showed a decline. The level of significance for the Druid Hill gains could not be determined because Druid Hill's initial scores were significantly above the control group.

In two areas, attitude toward school and attitude toward self, the results are difficult to interpret. Druid Hill scores show a decline, but that is also the trend for the district norm. Neither the decline in Druid Hill scores nor their difference from district norm is statistically signficant.

CHAPTER V

CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

This study was undertaken in order to measure the social and academic impact of Teams-Games-Tournament. Ninety-three students, using TGT in the fifth grade mathematics program at Druid Hill, served as the experimental group. Their achievement in mathematics was compared with the national norms of the California Achievement Test. Students attitudes were also examined. Attitudes at Druid Hill were compared with the school district norm in the areas of attitude toward math, attitude toward school, attitude toward self and cultural awareness. Devices developed by Omaha Public Schools were used to measure student attitudes.

In the area of mathematics computation, Druid Hill students showed 1.6 years growth; 1.0 was the corresponding growth shown by the norm group. In the area of mathematics concepts and applications the experimental group showed 1.4 years growth. A growth of 1.0 years represented the norm. Growth in both areas was statistically significant ($p < .001$).

It is likely that a number of factors contributed to the achievement of students in the experimental group. Additional instructional time was provided. Individual and group access to computer assisted instruction was available. Teachers were carefully selected on the basis of competence and desire to teach in that specific setting. Students, although representing a wide range of abilities, had expressed a specific interest in math and a desire to attend Druid Hill.

TGT was fully integrated as part of the regular classroom instruction. Teachers had an inservice program for TGT that continued through the first semester of the study. They were provided with the opportunity

to plan their specific math curriculum for the entire year. TGT team practices and tournaments were developed in conjunction with that curriculum planning.

It was not possible in this limited study to isolate to what degree each of the above factors influenced the achievement of the students in the experimental group. It should be noted, however, that the findings of this TGT study are consistent with the positive results in academic achievement that have been noted in other TGT studies.

The role of student attitude toward math also raises some interesting issues. Students in the experimental group started with an attitude toward mathematics that was above the norm. Their attitude continued to improve while that of the norm group declined. It is important to note the positive trend of the experimental group in comparison to the negative trend displayed by the norm.

However, this writer cannot isolate whether student attitudes affected achievement or whether it was achievement that affected attitudes. It is likely, that just as in the case of achievement, the motivation of teachers, computer instruction and TGT all had an interlocking role.

The social impact of TGT indicates mixed results. The difficulty in measuring social impact may be the result of the measurement devices that were used, the lack of a clear standard for positive or negative attitudes, or simply the complexity of dealing with human nature.

In the areas of cultural awareness, students in the experimental group made significant gains ($p \leq .01$). This is of special interest because of Druid Hill's role as a magnet school. Like other schools

in the system, Druid Hill has a mix of majority and minority students. However, that mix is totally unlike any other schools in the system. Students attend from over fifty different elementary school neighborhoods. The combination of geographic, social economic, racial and ethnic factors makes the Druid Hill school population unique. Its success as a magnet school depends upon its ability to develop an appreciation in the students for the differing cultural values of the school's total student population. Without question, that has been achieved. Because of the structured social interaction of TGT, as compared to individualized computer instruction, it is possible to conclude that TGT had an important role to play in cultural awareness.

Student attitude toward school showed a decline, although not significant. Statistically their attitude was unchanged. This can be interpreted in a positive light. The norms for the school district indicate a measurable decline in attitude that corresponds to how long a student remains in school. The trend at Druid Hill is for reasonably static attitude toward school.

Student attitude toward school does prevent a dichotomy when compared with some of the other data. Students were successful in their study of mathematics. Their attitude toward mathematics improved. Their attitude toward students of different cultures improved. However, none of this appears to have carried over into their attitude toward school. Perhaps other factors in the school climate, beyond those that are dealt with in this study, are responsible for the general attitude toward school.

There is one more important piece of information about attitude to-

ward school that should be considered. The school administration reports that 87% of the student population has requested to remain at Druid Hill rather than return to their home school or transfer to another school. That figure is considered very positive. The school's retention rate leads the author to two conclusions: either the measurement device is lacking or the static student attitude is a remarkable fact when compared with the district norm.

Scores reflecting attitude toward self are also interesting. Again, similar to the pattern for the district norm, students at Druid Hill showed a decline in this area. As in attitude toward school, that decline was not significant. However, there is also a dichotomy here. Students were successful in math. They had a positive attitude toward math. Attitudes toward cultural differences improved. It would seem that in order to find the reason for the pattern of decline in student attitude toward self it would be necessary to examine other factors that also influence self-concept.

Some general conclusions about TGT are now possible. Given the make up of the curriculum, TGT was successful. The area where TGT was used saw an improvement in student attitudes. However, with the exception of cultural awareness, there was little or no carry over into more general applications on the part of the students.

There are two clear implications for future applications of TGT. Multicultural magnet schools either defacto or by design are likely to become increasingly common. Overall, such schools do not have a proven record of success. Obviously, such schools need to do more than allow students to occupy space together. TGT provides a specific classroom

management system which creates a supportive learning environment where students can learn to trust, respect and work with one another, regardless of their cultural backgrounds. The results of this study at Druid Hill indicate the positive role that TGT can have within a magnet school. Further study of this application is recommended.

Computer assisted instruction is now an accepted part of education. Although not common in all school systems or classrooms, the use of computers is becoming more widespread. There is research which substantiates the academic benefits of computer assisted instruction. Little, if any, research has been done on the social impact of computers in the classroom. On the surface, computer assisted instruction would seem to further isolate the student from interaction with peers and teachers. There is ample evidence, some of which has been cited in this study, which suggests the critical role socialization plays in the school.

It would appear to be sound curriculum programming to balance computer assisted instruction with a management system that enhances social interaction among students. TGT or other team learning systems would seem to be the answer. This study did touch on the role of TGT and computer assisted instruction. However, the two did not directly interact. At Druid Hill, TGT was used as a part of regular classroom instruction. Computer instruction was done in a separate lab setting. It is probable that the two did interact and influence each other. This study was not designed to examine that. As further implications of team learning are undertaken it will be important to study the role and benefits of TGT when applied to computer assisted instruction.

RECOMMENDATIONS

Social, academic and technological changes continue to have an impact on the classroom. The multicultural nature of the classroom is becoming more evident. The need for interpersonal skills is increasing for today's students and tomorrow's adults. Electronic technology is making sweeping changes in how members of society communicate. Education must not only respond to these changes, but also prepare individuals to deal with unknown future changes.

The nature of team learning, along with the conditions and results of this study suggest that TGT has a role in the intertwining areas of multicultural education, interpersonal skills and electronic communication. Three recommendations result. Two are fairly obvious. There should be continued study of the impact of TGT on how students view members of other cultures. Research should also continue to examine the role of TGT in the development of interpersonal skills.

The third recommendation is more complex. Electronic technology, especially the use of computers, is playing an increasing role in the communication of knowledge within the school setting. The academic results have been, and are being, researched. Little attention has been paid to how interpersonal skills, and by implication, multicultural values are affected. The social impact of computer assisted instruction should receive close scrutiny. There is an implication from this study that TGT may have increased importance in a setting where there is the possibility of increased personal and cultural isolation resulting from a technological education. It is strongly recommended that the role of TGT in computer assisted instruction be closely examined.

APPENDIX A

Worksheet S-18: RENAME FRACTIONS WITH UNLIKE DENOMINATORS AS FRACTIONS WITH LIKE DENOMINATORS

TOPIC: Rename fractions with unlike denominators as fractions with like denominators.

1. Find a least common denominator:
   1/6, 2/3

2. 1/4 = ?/8

3. 2/5 = ?/15

4. 4/7 = ?/14

5. 1/3 = ?/9

6. Rename as like fractions:
   1/4, 2/3

7. Rename as like fractions:
   1/11, 1/2

8. 1/8 and 5/12

   Express as like fractions.

9. 1/8 and 1/3

   Express as like fractions:

10. Rename as like fractions:
    3/5, 9/10

11. 1/10 = ?/30

12. Rename as like fractions:
    2/3, 1/5

13. Rename as like fractions:
    2/5, 2/4

14. Find a least common denominator:
    1/5, 3/10

15. Find a least common denominator:
    1/4, 2/5

16. 3/4, 1/3

17. 5/8, 2/12

18. 1/3, 1/5

19. 4/5, 7/10

20. 7/8, 7/12

21. 5/7, 4/14

22. 1/8, 1/3

23. 3/5, 2/4

24. 3/4, 7/12

25. 3/4, 5/8

26. 2/3, 3/5

27. 1/3, 5/9

28. 7/18, 2/9

29. 4/7, 3/4

30. 7/8, 5/12

S-18: RENAME FRACTIONS WITH UNLIKE DENOMINATORS AS FRACTIONS WITH LIKE DENOMINATORS

Worksheet Answer Sheet

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1. 1/6, 4/6
2. 2/8
3. 6/15
4. 8/14
5. 3/9
6. 3/12, 8/12
7. 2/22, 11/22
8. 3/24, 10/24
9. 3/24, 8/24
10. 6/10, 9/10
11. 3/30
12. 10/15, 3/15
13. 8/20, 10/20
14. 2/10, 3/10
15. 5/20, 8/20
16. 9/12, 4/12
17. 15/24, 4/24
18. 5/15, 3/15
19. 8/10, 7/10
20. 21/24, 14/24
21. 10/14, 4/14
22. 3/24, 8/24
23. 12/20, 10/20
24. 9/12, 7/12
25. 6/8, 5/8
26. 10/15, 9/15
27. 3/9, 5/9
28. 7/18, 4/18
29. 16/28, 21/28
30. 21/24, 10/24

Game/Quiz S-18: RENAME FRACTIONS WITH UNLIKE DENOMINATORS AS FRACTIONS WITH LIKE DENOMINATORS

TOPIC: Rename fractions with unlike denominators as fractions with like denominators.

Find a least common denominator and express these unlike fractions as like fractions:

1. 2/6, 1/3
2. 2/10 = ?/30
3. 2/3, 1/5
4. 1/5, 3/4
5. 2/5, 4/10
6. 3/4, 2/5
7. 1/4, 1/3
8. 3/8, 5/12
9. 2/3, 3/5
10. 1/5, 7/10
11. 1/8, 5/12
12. 3/7, 5/14
13. 3/8, 1/3
14. 2/5, 1/4
15. 2/4, 4/12
16. 1/4, 6/8
17. 2/3, 3/5
18. 1/3, 5/9
19. 7/18, 2/9
20. 3/7, 1/4
21. 5/8, 5/12
22. 1/6, 1/3
23. 3/5 = ?/15
24. 2/3 = ?/9
25. 3/4 = ?/12
26. 2/4, 1/3
27. 1/8, 5/12
28. 3/8, 2/3
29. 2/5, 9/10
30. 4/10 = ?/40

S-18: RENAME FRACTIONS WITH UNLIKE DENOMINATORS AS FRACTIONS WITH LIKE DENOMINATORS

Game/Quiz Answer Sheet

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1. 2/6, 2/6
2. 6/30
3. 10/15, 3/15
4. 4/20, 15/20
5. 4/10, 4/10
6. 15/20, 8/20
7. 3/12, 4/12
8. 9/24, 10/24
9. 10/15, 9/15
10. 2/10, 7/10
11. 3/24, 10/24
12. 6/14, 5/14
13. 9/24, 8/24
14. 8/20, 5/20
15. 6/12, 4/12
16. 2/8, 6/8
17. 10/15, 9/15
18. 3/9, 5/9
19. 7/18, 4/18
20. 12/28, 7/28
21. 15/24, 10/24
22. 1/6, 2/6
23. 9/15
24. 6/9
25. 9/12
26. 6/12, 4/12
27. 3/24, 10/24
28. 9/24, 16/24
29. 4/10, 9/10
30. 16/40

APPENDIX B

Grade 5

Teams, Games, Tournament

Unit	Objectives		Unit Titles and Topics	Pages Houghton-Mifflin	Heath
1	501	504	Addition and Subtraction	2-23;310-311	22-49
	502a	505	Topics: a) add two, three, or four, 1-5 digit numbers using regrouping		
		506	b) subtract two 1-5 digit numbers using regrouping	2-23;310,311	22-49
2			Numbers (Place value) (Skill Sheets A & B)		
	503	502	Topics: a) Write the standard form of numbers having up to 12 digits	26-31	2-5,10-13
	504a	501	b) Compare two numbers having up to 4 digits	32,33	6,7
	527		c) Round a number less than 10,000 to the nearest ten or hundred	34-35,312; 238-241	8,9,13 214-215
			Measurement (Skills Sheets C & D)		
	525	556	Topics: a) Determine an appropriate metric unit for measuring length	36-39;48 144-145	236-239
	526	554	b) Determine an appropriate metric unit using milliliter, liter, gram, kilogram	36-39;48 144-145	236-249
	502h		c) Determine an appro- U.S. customary unit	39,40,41	232-235

Grade 5

Page 2

Unit	Objectives		Unit Titles and Topics	Pages Houghton-Mifflin	Heath
	507	520	d) Add or subtract with money	45,43,313 64,65;68,69	265,273, 274 (263-281)
3			Multiplication (Skills Sheets) A & B)		
	505	513	Topics: a) Multiply a 1 or 2	50-59;60-63	56-76
		514	digit number by an		
	506	515	up to 4 digit number with regrouping		
	508	527	b) Find the least common multiple of 2 numbers	66,67	60,61
	507	520,533	c) Solve word problems using money	68,71	77-79
4			Division (Skills Sheet A & B)		
	509	517	Topics: a) Perform up to four-		
	502c	519b	stage division using a 1 digit divisor, with a remainder	74-87;316	86-91, 94-99
	510		b) Divide a 2 or 3 digit number by a 2 digit multiple of 10	92-93 88-89	
	511	524	c) Find the greatest common factor of two numbers	90-91;317	90-91
	502b	519	d) Solve word problems, using the four basic operations	50-63	92;93; 110,111
5	528b		Multiplication and Division (Skills Sheets A & B)		
			Topics: a) Estimating a product of two numbers	98-99	64-65
	512	516	b) Multiply a 2 or 3 digit number by a two digit number	98-105;318	73-76; 80

Grade 5

Page 3

Unit	Objectives		Unit Titles and Topics	Pages Houghton-Mifflin	Heath
	513	518	c) Divide up to a 3 or 4 digit number with a remainder	106-115;319	102-109
	502d	519	d) Solve word problems which include unnecessary information; involving multiplication and division of whole numbers	98-119	
6			Fractions (Skills Sheets A & B)		
	514	529	Topics: a) Write a fraction for the shaded part of the region	122-213	148-149
	515	530	b) Identify the numerator and denominator of a fraction	124-125	148
	516a	531	c) Find a fractional part of a number	126-129;320	186-191
	517	532	d) Write equal fractions (simplifying)	130-135	154-159
	504b	501	e) Compare fractions with like denominators	136-137;321	160-161
	502e		f) Solve word problems using fractional parts and information from a circle graph	122-141	167,203
7	525	556	Measurement (Skills Sheets A & B)		
			Topics: a) Measure lenght to the nearest centimeter and millimeter	144-145	236-239
	532	508	b) Find perimeter	146-147	240-241; 252-253

Grade 5

Page 4

Unit	Objectives		Unit Titles and Topics	Pages Houghton-Mifflin	Heath
	540		c) Find diameter and circumference	148-149	128-129
	540		d) Determine size and type of angle	150-153;322	122-125; 128-129
	533	510	e) Find the area of a shape	154-157	242-243; 252-253; 256-257
	541		f) Find volume	158-159	244-245; 252-253
	542		g) Interpret a scale drawing	160-161;323	
	543		h) Solve word problems which may require information from a table of measures	162-163	
8			Decimals (Skills Sheets A & B)		
	534	550	Topics: a) Write decimals using tenths and hundredths	168-173	208-211
	504d		b) Compare decimals	174-177;324	212-213
	535 502k	551	c) Add decimals	178-179	216-225
	536 502k	552	d) Subtract decimals	180-181	216-225
	550		e) Multiply decimals by a 1 digit whole number	182-183	
9			Addition of Fractions (Skills Sheets A & B)		
	518 520	535 536	Topics: a) Add fractions with like and unlike denominators, regrouping as necessary	190-193;198-210;190-209	162-167; 174-175

Grade 5

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Unit	Objectives		Unit Titles and Topics	Pages Houghton-Mifflin	Heath
	519	533	b) Write a fraction as a mixed number or a whole number	194-197;326	176-179; 284-285
	521	540	c) Add mixed numbers with like and unlike denominators re-grouping as neces-sary	202-205	286-289; 292-295
	504c	501	d) Use < or > to com-pare fractions with unlike denomi-nators	206-207;327	160-161
10	522	539	Subtraction of Fractions (Skills Sheets A & B) Topics: a) Subtract fractions with like and un-like fractions	214-221	162-175
	523		b) Subtract a mixed number or a frac-tion from a whole or another mixed number with like and unlike denomi-nators regrouping as necessary	222-231;328; 329	284-287 290-293
	502g	537	c) Solve word problems using two or more arithmetic steps	214-233	294-295
11			Estimation and Statistics (Skills Sheets A & B)		
	528a		Topics: a) Use an estimate to check the reasonable-ness of a given sum, difference, product, or quotient	238-248;312	30-31; 40-41; 64-65; 99;103; 312;313
	527		b) Round numbers to the place given and round amounts of money to the near-est dollar	34-35;238-241;312	8-9;13; 214-215

Grade 5

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Unit	Objectives	Unit Titles and Topics	Pages Houghton-Mifflin	Heath
	546 521	c) Find the mean (average) of a group of numbers	248-250;259	100-101; 113
	529 512	d) Interpret a bar graph	252-255;259; 331	100-101; 153;181; 227;297
12		Fractions, Decimals, and Percents (Skills Sheets A& B)		
	516B 531 530 548	Topics: a) Multiply a fraction by a whole number or another fraction	262-263; 270-271;332	192-195
	531 502j	b) Multiply a mixed number by a fraction, whole number or another mixed number	266-269; 263-271; 280-281	
	550	c) Multiply a decimal and a whole number or two decimals in tenths	182-183; 274-275	302-307
		d) Write fractions and decimals as percents and percents as decimals and fractions	276-279	
13		Geometry (Skills Sheet A)		
	551	Topics: a) Identify angles, parallel line, perpendicular lines, and other geometric shapes	286-289; 292-297; 300-304	118-137
	551	b) Match triangles with an appropriate description of the triangles	290-291	137

Grade 5

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Unit	Objectives	Unit Titles and Topics	Pages Houghton-Mifflin	Heath
	551	Geometry continued...		
		c) Write the number pair for a point and name the point for a number pair	289-299	118-119; 138-141

APPENDIX C

Grade 5

Unit 10 Subtraction of Fractions

Skills Sheet A

Topics: A) Subtract fractions with like and unlike denominators

B) Subtract a mixed number or a fraction from a whole number or another mixed number with like and unlike denominators regrouping as necessary.

C) Solve word problems using two or more arithmetic steps.

1. 2/4 - 1/4 2. 7/10 - 3/10 3. 13/32 - 9/32 4. 2/3 - 1/3

5. It takes 5/8 of an hour to make mashed potatoes and 3/8 of an hour to cook rice. How much longer does it take to make mashed potatoes?

6. $\frac{11}{20} - \frac{6}{20}$ 7. $\frac{17}{18} - \frac{8}{18}$ 8. $\frac{19}{28} - \frac{15}{28}$ 9. $\frac{7}{12} - \frac{1}{3}$ 10. $\frac{1}{4} - \frac{3}{16}$

11. In a microwave oven, it takes 7/8 of a minute to heat a roll and 3/8 of a minute to heat some oatmeal. How much faster is it to heat a roll?

12. $\frac{3}{4} - \frac{2}{5}$ 13. $\frac{5}{8} - \frac{1}{3}$ 14. $\frac{1}{2} - \frac{1}{3}$ 15. $4 - \frac{3}{8}$

16. The team spent 3/4 of an hour jogging. They skipped rope for 1/4 of an hour. How much longer was spend jogging?

Grade 5

Unit 10 Subtraction and Fractions

Skills Sheet A page 2

17. $\begin{array}{r} \frac{5}{6} \\ -\ \frac{7}{24} \\ \hline \end{array}$

18. $\begin{array}{r} 10 \\ -\ \frac{4}{7} \\ \hline \end{array}$

19. $\begin{array}{r} 9 \\ -\ 3\ \frac{3}{8} \\ \hline \end{array}$

20. $\begin{array}{r} 4\ \frac{7}{10} \\ -\ 2\ \frac{3}{10} \\ \hline \end{array}$

21. $\begin{array}{r} 11\ 2/5 \\ -\ 4\ 3/5 \\ \hline \end{array}$

22. $\begin{array}{r} 6\ 1/5 \\ -\ 4\ 3/5 \\ \hline \end{array}$

23. $\begin{array}{r} 8 \\ -\ 1\frac{1}{4} \\ \hline \end{array}$

24. 1 3/4 = ?/4

25. 7 2/3 = 6 ?/3

26. $\begin{array}{r} 9\ 1/3 \\ -\ 2\ 1/5 \\ \hline \end{array}$

27. $\begin{array}{r} 4\ 5/6 \\ -\ 1\ 5/9 \\ \hline \end{array}$

28. $\begin{array}{r} 6\ 1/8 \\ -\ 1\ 1/4 \\ \hline \end{array}$

29. $\begin{array}{r} 13\ 3/8 \\ -\ 4\ 5/6 \\ \hline \end{array}$

30. Ted, Carol and Alice inflated a raft in 12 minutes. Ted pumped for $2\frac{1}{2}$ minutes and Carol pumped for $3\frac{1}{4}$ minutes. How long did Alice pump?

Grade 5

Unit 10 Subtraction of Fractions

Skills Sheet A (Answers)

1. 1/4
2. 2/5
3. 1/8
4. 1/3
5. 1/4 hour
6. 1/4
7. 1/4
8. 1/7
9. 1/4
10. 1/16
11. 1/2 minute
12. 7/20
13. 7/24
14. 1/6
15. 3 5/8
16. 1/2 hour
17. 13/24
18. 9 3/7
19. 5 5/8
20. 2 2/5
21. 6 4/5
22. 1 3/5
23. 6 3/4
24. 7
25. 5
26. 7 2/15
27. 3 5/18
28. 4 7/8
29. 8 13/24
30. 6 1/4 min.

Grade 5

Unit 10 Subtraction of Fractions

Tournament

1. Subtract 3/5 from 9/10.

2. Kay swam ½ of a mile in the morning and 5/8 of a mile in the afternoon. How much farther did she swim in the afternoon?

3. $\begin{array}{r} 8\ 1/3 \\ -\ 3\ 1/6 \\ \hline \end{array}$

4. $\begin{array}{r} 9\ 1/6 \\ -\ 3\ 3/4 \\ \hline \end{array}$

5. $\begin{array}{r} 8\ 7/8 \\ -\ 2\ 3/8 \\ \hline \end{array}$

6. Change 4 3/4 to an improper fraction, 4 3/4 = ?/4.

7. $\begin{array}{r} 11 \\ -\ 5\ 3/4 \\ \hline \end{array}$

8. $\begin{array}{r} 8 \\ -\ 3\frac{1}{2} \\ \hline \end{array}$

9. $\begin{array}{r} 6 \\ -\ 4\ 3/5 \\ \hline \end{array}$

10. Kim is 8 3/4 inches taller than her little brother. If Kim is 58½ inches tall, how tall is her brother?

11. $\begin{array}{r} 6\ 1/8 \\ -\ 3\ 3/4 \\ \hline \end{array}$

12. $\begin{array}{r} 12\ 2/3 \\ -\ 8\ 5/6 \\ \hline \end{array}$

13. $\begin{array}{r} 7\ 1/3 \\ -\ 5\ 3/4 \\ \hline \end{array}$

14. $4\frac{1}{2} - 2\frac{1}{2}$

15. $\frac{A}{B}$ In fractions, what is the top number (A) called?

16. On her first try, Mary long-jumped 12 5/6 feet. On her second try, she jumped 13¼ feet. How much farther was her second jump?

17. To add, 8 2/3 and 6 4/5, what will be the denominator?

18. 5/8 - 2/8

19. $\begin{array}{r} 13\ 4/5 \\ -\ 10\ 1/2 \\ \hline \end{array}$

20. $\begin{array}{r} 7\ 3/4 \\ -\ 6 \\ \hline \end{array}$

21. $\begin{array}{r} \frac{5}{6} \\ -\ \frac{5}{9} \\ \hline \end{array}$

22. Brought 3/4 dozen. Ate 1/4. What fraction of a dozen was left?

Grade 5

Unit 10 Subtraction of Fractions

Tournament page 2

23. $\frac{6}{5} - \frac{1}{5}$

24. 7/8 - 7/8

25. 9 5/6
- 4 1/3

26. 7 3/4
- 1 5/8

27. 17 2/3

28. $\frac{A}{B}$ In fractions, what is the bottom number (B) called?

29. Each birdhouse was to be placed 5 5/8 ft above the ground. If the posts were 7½ feet long, how deep did the holes have to be?

30. This week, Mary worked on odd jobs 3½ hours, 4 3/4 hrs, and 8 hrs. Last week her working hours totaled 15½ hours. In which week did she work longer; this week, or last week?

Grade 5

Unit 10 Subtraction of Fractions

Tournament (Answers)

1. 3/10
2. 1/8
3. 5 1/6
4. 5 5/12
5. 6 1/2
6. 19/4
7. 5/14
8. 4 1/2
9. 1 2/5
10. 49 3/4
11. 2 3/8
12. 3 5/6
13. 1 7/12
14. 2
15. numerator
16. 5/12
17. 15
18. 3/8
19. 3 3/10
20. 1 3/4
21. 5/18
22. 1/2
23. 1
24. 0
25. 5 1/2
26. 6 1/8
27. 13 1/3
28. denominator
29. 1 7/8
30. This week

APPENDIX D

OMAHA PUBLIC SCHOOLS
OMAHA, NEBRASKA
ATTITUDE TOWARD MATHEMATICS (INTERMEDIATE)

		TRUE	FALSE
1.	MATH IS MY FAVORITE SUBJECT.....	( )	( )
2.	I FEEL UNCOMFORTABLE IN MATH CLASS.....	( )	( )
3.	MATH IS THE SUBJECT I LIKE LEAST.....	( )	( )
4.	I THINK I CAN STUDY MATH ON MY OWN.....	( )	( )
5.	I LIKE MATH.....	( )	( )
6.	I LIKE MATH BETTER THIS YEAR THAN ANY OTHER YEAR.....	( )	( )
7.	I AM NO GOOD IN MATH.....	( )	( )
8.	I LIKE SCHOOL.....	( )	( )
9.	MATH WILL HELP ME LATER IN LIFE.....	( )	( )
10.	I DO NOT LIKE MATH.....	( )	( )
11.	I LOOK FORWARD TO MATH TIME.....	( )	( )
12.	EVERYONE NEEDS TO STUDY MATH.....	( )	( )
13.	MATH IS VERY DIFFICULT FOR ME.....	( )	( )
14.	I FEEL GOOD WHEN I'M STUDYING MATH.....	( )	( )
15.	IT DOESN'T MAKE ANY DIFFERENCE TO ME HOW MATH IS TAUGHT, I STILL LIKE IT.....	( )	( )
16.	I WOULD NOT STUDY MATH IF I DID NOT HAVE TO.....	( )	( )
17.	I USE MATH A LOT.....	( )	( )
18.	MATH IS EASY TO UNDERSTAND.....	( )	( )
19.	I CAN CONCENTRATE ON MATH.....	( )	( )
20.	MATH IS INTERESTING.....	( )	( )

APPENDIX E

OMAHA PUBLIC SCHOOLS
OMAHA, NEBRASKA
STUDENT ATTITUDE QUESTIONNAIRE (SAQ-HCR)

		YES	NO	I DON'T KNOW
1.	DO YOU LIKE STUDENTS WHO LOOK DIFFERENT THAN YOU DO..	( )	( )	( )
2.	DO YOU THINK THAT SCHOOL IS FUN.....	( )	( )	( )
3.	DO YOU LIKE TO PLAY GAMES WITH STUDENTS FROM DIFFERENT NEIGHBORHOODS.....	( )	( )	( )
4.	DO YOU FEEL GOOD WHEN IT IS TIME TO GET UP AND GO TO SCHOOL.....	( )	( )	( )
5.	DO THE KIDS IN YOUR ROOM LIKE YOU.....	( )	( )	( )
6.	DO YOU THINK IT'S O.K. TO CALL ANOTHER STUDENT NAMES IF IT'S JUST PLAYING.....	( )	( )	( )
7.	WOULD YOU RATHER DO SCHOOLWORK ALONE THAN WITH A GROUP OF STUDENTS.....	( )	( )	( )
8.	DO YOU FEEL GOOD ABOUT GOING TO SCHOOL.....	( )	( )	( )
9.	DO YOU THINK IT'S A GOOD IDEA TO MAKE FRIENDS WITH PEOPLE FROM NEIGHBORHOODS DIFFERENT FROM YOURS.....	( )	( )	( )
10.	DO YOU WANT TO QUIT SCHOOL.....	( )	( )	( )
11.	DO YOU LEARN THINGS FAST.....	( )	( )	( )
12.	DO YOU LIKE THE WAY YOU LOOK.....	( )	( )	( )
13.	DO YOU LIKE THE OTHER KIDS IN YOUR ROOM.....	( )	( )	( )
14.	DO YOU THINK IT'S A GOOD IDEA TO GO TO SCHOOL WITH STUDENTS FROM DIFFERENT NEIGHBORHOODS.....	( )	( )	( )
15.	DO YOU USUALLY IGNORE THE FEELINGS OF OTHERS WHEN YOU DO THINGS.....	( )	( )	( )
16.	DO YOU LIKE TO SIT NEXT TO STUDENTS FROM DIFFERENT NEIGHBORHOODS.....	( )	( )	( )
17.	WOULD YOU RATHER STAY HOME THAN GO TO SCHOOL.....	( )	( )	( )

APPENDIX E (CONT'D.)

	YES	NO	I DON'T KNOW
18. DO YOU THINK THAT SCHOOL IS BORING.....	( )	( )	( )
19. DO YOU KNOW A LOT.....	( )	( )	( )
20. ARE YOU A HAPPY PERSON.....	( )	( )	( )
21. DO YOU HAVE MANY FRIENDS IN SCHOOL.....	( )	( )	( )
22. DO YOU LIKE TO TAKE PART IN TEAM GAMES.....	( )	( )	( )
23. DO YOU LIKE TO HELP OTHER PEOPLE.....	( )	( )	( )
24. DO YOU LIKE PEOPLE EVEN THOUGH THEY MAY DISAGREE WITH YOU.....	( )	( )	( )

APPENDIX F

INSTRUCTIONAL RESEARCH REPORT #1981-7
OMAHA PUBLIC SCHOOLS
OMAHA, NEBRASKA

EVALUATION #1 OF PROGRAMS AT DRUID HILL SCHOOL

Introduction

The Druid Hill Science/Math Center is a special elementary school for grades K, 1, 4, 5, and 6, with instructional emphasis on science and mathematics in grades 4, 5, and 6. The school was created as the result of a Consent Decree negotiated between the School District of Omaha, the Plaintiff Intervenors, and the U.S. Department of Justice during the Spring of 1980. In accordance with provisions of the Court Decree, the school opened in the Fall of 1981, serving both the Druid Hill and former Monmouth Park attendance areas. In addition, non-black students in grades 4, 5, and 6 are attracted to the school on a voluntary basis from eligible areas throughout the district, under provisions of the "magnet school" concept.

The Druid Hill Program is unique in the School District of Omaha and was designed to provide enriched experiences and opportunities in the areas of science and mathematics.

All students in grades K, 1, 4, 5, and 6 residing within the Druid Hill-Monmouth Park attendance areas are eligible to attend the center. Students in grades 2 and 3 residing in the area are served in a nearby Primary Center.

The center serves approximately 475 students, representing 52 schools located throughout the School District of Omaha. Although the instruc-

tional program emphasizes science and mathematics, the school serves a wide range of student abilities and interests.

The success of the first year of operation of the instructional program can be measured in part by the fact that approximately 89% of those students originally selected to attend the Druid Hill Science/Math Center reapplied to return the next year.

The Druid Hill program in mathematics has the following characteristics.

1. Students receive mathematics instruction from regularly adopted Omaha Public School textbooks about 45 minutes per day as do students in all the elementary schools.
2. The Druid Hill mathematics program provides for an additional 70 to 90 minutes of instruction per week. The thrust of instruction for the additional time is described below.
    a. MASTERY INSTRUCTION An SRA computer learning package allows students to study in areas of weakness. The program is designed so that students achieve mastery in one topic before moving to another. Lack of motivation is not a problem with this computerized approach. The computer assisted instruction approach firms up background skills for those having problems with in-class work. At the same

time, high ability students are exposed to new concepts yet to come in mathematics course sequence. High ability students are also introduced to computer programming. About half of the extra weekly time is devoted to computer assisted instruction.

b. MATHEMATICS TO BUILD AND MAINTAIN INTEREST Since mathematics includes much repetition, an attempt is made to show some of the uses and fascinition of mathematics by using mini-units of various types:

(1) MIRA reflection instruments. (Geometric discovery.)

(2) Abacus work.

(3) Calculators.

(4) Chip Trading. (A carefully developed sequence of games, activities, and problems to help students learn basic mathematics skills.)

c. TEAMS-GAMES-TOURNAMENTS This program provides the teacher with a classroom management system that carefully structures teacher instruction and student learning. TGT

also motivates students and rewards students for learning and cooperating with others.

Teacher instruction is used to introduce thoroughly a particular skill or concept to the class. The teacher then reinforces the lesson through a system of carefully structured team practices and a closing academic tournament.

The membership of each four or five member team is balanced to reflect the racial, sexual, and academic make-up of the class. The team practice is structured so each individual is directly accountable for a portion of the material. Team members then tutor and check each others work to assure accuracy and completion of the assignment.

At the end of a unit, competitive academic tournaments are held. Students compete against individuals of equal ability from other teams in order to win points for their team. The tournament, in addition to motivating students, reinforces the individual accountability and group respon-

sibility of the team practices.

The total process is designed to improve self-concept, academic achievement, and interpersonal relationships (especially in multicultural settings).

The focus of this report is on student attitude and achievement especially in the area of mathematics.

Attitudes of Students

Table I shows the attitudes of Druid Hill students as measured by the Student Attitude Questionnaire. This questionnaire was designed to measure attitudes of students in three areas: (1) attitude toward school, (2) attitude toward self and others, and (3) cultural awareness. As Table I indicates, the attitude of Druid Hill students toward school on the pre-test was slightly below the norm group at the fourth grade level, slightly above the fifth grade level, and the same at the sixth grade level. On the post-test, the attitude toward school at Druid Hill was above the norm group at the fourth and sixth grade levels and below at the fifth grade level. In normal situations, attitude toward school usually drops slightly as the year progresses. However, this trend was reversed at Druid Hill at the fourth and sixth grade levels. Student attitudes toward themselves and others followed a somewhat similar pattern. At the fourth and sixth grade levels, attitudes improved during the year. Cultural awareness scores at all three levels were consider-

ably above the norm group on the pre-test and improved during the year. Statistically significant differences were found between the post-test means and means of the norm group at all three grade levels. Although there were differences in other scores, none were statistically significant.

TABLE I

STUDENT ATTITUDE QUESTIONNAIRE

DRUID HILL SCHOOL, GRADES 4-6, 1981-82

GRADE	SUB-TEST	Norm Group		Pre-Test		Post-Test		Significant Difference	
		Mean,	S.D.	Mean,	S.D.	Mean,	S.D.	Norm Group	Pre-Test
4	Attitude Toward School	23.1	6.2	22.5	7.7	23.5	7.6	--	--
	Attitude Toward Self & Others	33.3	5.4	32.2	7.0	32.6	6.7	--	--
	Cultural Awareness	24.4	4.7	25.3	5.1	26.2	5.3	**	--
	Total	--	--	79.9	16.3	82.3	15.6	--	--
5	Attitude Toward School	22.5	6.1	22.9	6.1	22.3	7.2	--	--
	Attitude Toward Self & Others	32.7	5.7	33.6	5.4	32.5	5.5	--	--
	Cultural Awareness	25.7	4.3	26.2	4.6	27.1	4.2	*	--
6	Attitude Toward School	22.1	6.5	22.1	6.5	22.8	6.2	--	--
	Attitude Toward Self & Others	33.3	5.3	33.1	5.4	33.3	5.2	--	--
	Cultural Awareness	24.8	4.3	26.8	3.9	27.5	3.8	**	--
	Total	--	--	82.0	12.6	83.6	11.6	--	--

* $p \leq .01$
** $p \leq .001$

Table II shows student attitudes toward mathematics at the fifth grade level. Since students who are in the fifth grade will remain at Druid Hill for another year, attitudes toward mathematics were monitored only at this level. As Table II shows, student attitude toward mathematics at Druid Hill showed statistically significant differences from the norm group for both pre-test and post-test means. For the Druid Hill group, attitude toward mathematics improved during the year to a very high 16.0 mean. A score of 20 is the highest possible score. In comparison to control group means, there were no statistically significant differences. The improvement in the mean for the experimental group as compared to a stable mean for the control group should be noted.

TABLE II

ATTITUDE TOWARD MATHEMATICS

GRADE FIVE

1981-82

Pre - Test Means			Post - Test Means		
Experimental Group	Norm Group	Control Group	Experimental Group	Norm Group	Control Group
15.3	13.8**	15.2	16.0	13.5**	15.2

** $p < .001$

Scholastic Achievement

Table III shows the mathematics achievement of students at Druid Hill school compared to the norm group. At the beginning of the year, students at Druid Hill were above national norms at all grade levels except

for the Concepts and Applications sub-test of the California Achievement Tests in Grade 4. At the end of the year, students had improved their standings in relationship to the norm group with the exception of the fourth grade students in the Computation sub-test of the California Achievement Tests. Statistically significant differences were found at the fifth and sixth grade levels.

TABLE III

ACHIEVEMENT IN MATHEMATICS*

CALIFORNIA ACHIEVEMENT TESTS

Grade	SUB-TEST	Pre - Test			Post - Test		
		Norm Group	Druid Hill	Difference	Norm Group	Druid Hill	Difference
4	Computation	367	387	+20	415	432	+17
	Concepts & Applications	405	403	- 2	437	445	+ 8
5	Computation	415	429	+14	453	488	+35**
	Concepts & Applications	437	452	+15	467	490	+23**
6	Computation	453	468	+15	486	518	+32**
	Concepts & Applications	467	472	+ 5	493	508	+15*

* $p \leq .01$
** $p \leq .001$

* Achievement scores shown in Table III are scale scores. Scale scores are produced from a single, equal-interval scale of scores across all grades for use with all levels of the California Achievement Test. The scale is expressed in three digit numbers ranging from 000 to 999. Because each level of CAT was administered to successive grades during

the standardization, thus creating overlap from level to level, it is possible to describe the range of school achievement from kindergarten through high school on a single scale. Scale scores for the norm group correspond to the 50th percentile rank.

Table IV shows the scholastic achievement of students at Druid Hill as measured by Total Battery scores on the California Achievement Tests. The table indicates the percentage of Druid Hill students at each grade level who scored in each percentile rank quarter on national norm tables. At the beginning of fourth grade, for example, 24.3 percent of the Druid Hill students achieved a percentile rank between and including the 76th and 99th percentile ranks. At the end of fourth grade, 25.7 percent of the students earned a percentile rank between and including 76 and 99.

At both the fifth and sixth grade levels, a higher percentage of students scored above the 50th percentile rank at the end of the 1981-82 school year than at the beginning. At the fourth grade level, a slightly lower percentage of students scored above the 50th percentile rank at the end of the year.

TABLE IV

TOTAL BATTERY SCORES

GRADES 4-6, 1981-82

	Percentile Rank Quarter							
	76-99		51-75		26-50		1-25	
GRADE	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test
4	24.3	25.7	25.7	21.4	34.3	35.7	15.7	17.1
5	32.0	45.0	30.0	24.0	28.0	26.0	10.0	5.0
6	25.9	30.6	27.1	28.2	40.0	29.4	7.1	11.8

Summary

In its first year of operation, Druid Hill seemed to experience a great deal of success in both the student achievement and attitude areas. In the area of student achievement, students generally did better at the end of the year than at the beginning in relationship to the norm group for the California Achievement Tests. In mathematics, some gains were dramatic. In the area of student attitude, means were very positive in all areas, and notably favorable in attitude toward mathematics and cultural awareness.

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5-18-82