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ABSTRACT

The Helping Hands Project (HHP) is a program that aims at improving achievement in reading comprehension and in math problem-solving by helping the classroom teacher sustain instructional intensity. Implemented in grades four and six in two Newark School District elementary schools, HHP involved five teachers and 117 students. Ninety-two percent of the participants had an ethnic minority background (Black, Hispanic, Portuguese). The introductory chapter of this evaluation report discusses the need for the program, presents all the elements that form the core of HHP, and reviews the stages of implementation. Chapters 2 and 3 explain the resulting impact on math concepts/applications and reading comprehension respectively. Chapter 4 examines the degree of adjustment to school as reflected in peer acceptance, attendance pattern, student turnover or transiency, and achievement. Chapter 5 attempts to clarify some of the strategies (with their attendant difficulties) used by students in processing information and solving problems. The final chapter shows how this project can contribute to the solution of some of the school district's problems and charts new directions for educational improvement. The appendix contains the Awards Certificate, the Friendship Test, the Bi-Weekly-Progress Report Form, a grade 4 mathematics test, a grade 6 reading test, and the Newark Library Survey. (PN)

HELPING HANDS PROJECT

EVALUATION REPORT

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Preface

In presenting this report on the Helping Hands project, the Division of Research and Evaluation takes one more lap in the continuing search for educational excellence in the district. That search has taken us from the outer circles into the heart of the schooling experience to deal with factors that directly influence academic learning. Indeed, gradually adjusting its focus, the Division has carried its analyses from the district level, to specific program level, to the school building level, and with this project to the classroom level. Lets briefly put things in perspective here. The initial effort undertaken by the Division consisted of a survey on the "Characteristics of High Achieving Elementary Schools in Newark," which tried to explain (to ourselves and to others) how the organizational goals and processes were articulated to promote student achievement. As a follow-up, the Division then concentrated its attention on the largest educational project in the district, the Title I/Chapter I Program. By introducing new concepts (such as the criteria for efficiency and proficiency), by working out feedback mechanisms, and by redirecting the flow of information towards all components of the program (not just reading and math), the annual evaluation report was transformed into a management tool to help restructure Basic Skill instruction in the district. While broadening this endeavor to include other instructional approaches (such as Computer Assisted Instruction), the Division entered a new range of applications: it worked towards the development of a "School Effectiveness Monitoring System," and tailored a "Process to Improve Test Scores" to the specifications of the neediest schools in the district. All these efforts could only lead to a new level of commitment. The experience garnered along the way shaped the development of the Helping Hands project. But, while only an indirect impact on student achievement could

be expected from our earlier attempts, this time the Division sent an advance team right into the classroom, "where the action is." The intervention was guided by educational theory (for as everyone now knows, nothing is more practical than a good theory). The practices we observed have, in turn, challenged and enriched our theoretical understanding of schooling and learning. The outcomes show that the experience was extremely valuable for us and the participating students. In as much as it can be condensed, we have tried to share it with you in this brief report.

The introductory chapter discusses the need for the program, presents all the elements that form the core of the Helping Hands project, and reviews the various stages of implementation. Chapters 2 and 3 explain the resulting impact on math concepts/applications and reading comprehension respectively. Chapter 4 looks at the degree of adjustment to school as reflected in peer acceptance, attendance pattern, student turnover or transiency, and of course achievement. Chapter 5 tries to clarify some of the strategies (with their attendant difficulties) used by students in processing information and solving problems. The final chapter shows how this project can contribute to the solution of some of the school district's problems and charts out some new directions for educational improvement.

Acknowledgements

From its conceptualization, through the various stages of implementation to this final evaluation, the Helping Hands project could not have been sustained without the commitment of several individuals who made significant contributions in different ways. We would like to express our gratitude to them.

Foremost recognition is due to the school principals: Mrs. June Lockett, Mr. Cesar Casale, and their vice-principals, who welcomed us to their schools and helped us lay the foundations of the project. Our deepest gratitude goes to the teachers: Mrs. Carney, Mrs Cucci, Mrs. Difino, Mr. Dipopolo, and Mrs. Johnson for letting us be witnesses to the ecstasy and the agony experienced day after day behind those closed classroom doors. Thanks to the students in those classes for their continuous involvement and their enlightening comments on the homework papers.

We greatly appreciate the assistance received from Dr. Russell Dusewicz, Dr. Joan Buttram, and other staff members at Research for Better Schools, in scoring the Metropolitan Achievement Test (the formative instrument) and in developing the survey of school libraries. Mr. Frederick Ransom and his team of librarians broadened our scope by the wealth of information they provided us with during that survey.

Finally, thanks to our colleagues in the Division of Research and Evaluation, especially to our director, Dr. Ram Durga, who challenged us to take on that task, and continuously gave us the resources and the encouragement to carry it through.

Executive Summary

I. What Is This Project About?

The Helping Hands Project is a program that aims at improving achievement in reading comprehension and in math problem-solving by helping the classroom teacher sustain instructional intensity. The main features of the project are:

1. A program of weekly homework that emphasizes logical analysis.
2. A progressive reward system that provides reinforcement for good academic performance.
3. The use of diagnostic methods and formative testing to maintain alignment between instructional objectives and standardized test objectives.
4. The utilization of student interrelationships to support grouping, morale, and discipline.
5. The broadening of the learning experience beyond the classroom by developing weekly educational TV guides.

The project was implemented in grades four and six in two elementary schools. It involved 5 teachers and 117 students. Ninety two percent of the participants had an ethnic minority background (Black, Hispanic, Portuguese).

II. What Has This Project Accomplished?

The evaluation report uses analysis of covariance to compare the achievement of project participants to that of a control group drawn from several other classes at the same grades and schools. For both pretest and posttest, the Comprehensive Tests of Basic Skills (CTBS, 1982) was used as the achievement criterion. Results show that at the fourth grade level project students out-scored the control group by 10 NCEs in math concepts/applications (effect size of .81) and by 4 NCEs in reading comprehension (effect size of .66). Both gains are statistically significant beyond .01. At the sixth grade level project participants out-performed the control group by 7 NCEs in math

concepts/applications (effect size .72) and by 1 NCE in reading comprehension (effect size .08). The gain in reading, however, does not reach statistical significance for this subgroup.

III. How Can This Project Help Improve the General Educational Program?

1. There is great readiness for further development in mathematics. To bring this about, the instructional approach must introduce students to rule applications, rather than providing them with a set of cues toward problem-solving.

2. To improve reading, students must get access to books. There is a need for better school libraries and/or greater integration of library transactions into the schedule of school activities.

3. Composition and other writing assignments should be more frequent at the intermediate grade levels. This is likely to have a carry-over effect on reading, and will certainly serve as an early preparation for the HSPT.

4. The strategies tested here can be very useful in dealing with the newly mainstreamed bilingual pupils, the retainees, and the potential dropout.

5. Provide parents, on a regular basis, with a preview of subskills to be taught in school.

6. Set up a peer support network in the classroom in order to reduce discipline problems, absenteeism, and student turnover.

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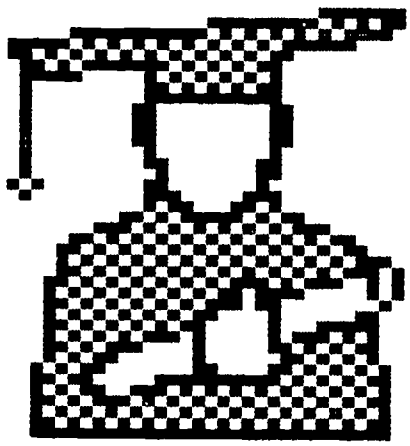


ENGINEERING SCHOOL ACHIEVEMENT

Definition

The Helping Hands Project is a program of applied research developed for the intermediate grades to assist teachers on a weekly basis with the management of learning.

The objective of the project: promote greater convergence between learning and affective development.

Since the management of learning, to be effective, calls for a degree of convergence between cognitive and affective behaviors, the program has two facets. On the cognitive side, it operates according to a three-step process of targeting, monitoring, and reinforcing a set of instructional objectives within the curriculum. On the affective side, the program follows two parallel tracks: one seeks to build up students' academic self-concept; the other aims at reducing the amount of competition that learning gets from some other sources in and out of the classroom.

To promote these goals, the project offers the following features:

1. A program of weekly homework that provides for overlearning, and emphasizes the analytical skills necessary for reading comprehension and arithmetic problem-solving.

The foundations of academic development necessitates: homework, reinforcement formative testing, coordinated home support and cooperative learning.

2. A progressive reward system that insures continuous reinforcement for good academic performance.
3. The use of diagnostic and formative testing to maintain alignment between instructional objectives and standardized test objectives.
4. The nurturing of student interrelationships to support grouping, discipline, and class morale.
5. The broadening of the learning experience beyond the classroom by suggesting alternative sources for information and cognitive development.

Need

Although conceived as an experimental program, activities for the Helping Hands project were calibrated to address specific academic needs in the district. The principal one was for an accelerated development of skills in reading comprehension and arithmetic problem solving. An analysis of the district-wide results on the Comprehensive Tests of Basic Skills (CTBS, 1981) found that students tended to have their greatest difficulty in those two content areas. From the same set of longitudinal data, it had become apparent that the difficulty was particularly acute in grades 4 and 6. Thus, the recommendation was offered that "teachers at these grade levels should adopt concepts and applications as the top math skill development priority...while targeting their efforts at comprehension in reading" (Division of Research and Testing, June 1984, pp 3 and 10).

Taking these two areas as the main points of focus for cognitive development, the Helping Hands project further broke them down into specific instructional objectives. For reading, the objectives targeted for mastery were: knowledge of word in context, retrieval of passage details, definition of main ideas, character analysis, understanding of generalizations, and knowledge of literary techniques. For math, the objectives targeted for mastery included: numeration, number theory, numerical strategies for problem-solving (number sentences), verbal strategies for problem-solving (word problems) measurement, and elementary geometry.

Testing must be integrated into the instructional process as a formative rather than a summative tool.

These instructional objectives overlap to a large degree with the clusters of skills making up the CTBS. To that extent, the Helping Hands project was addressing a second district need: it provided a way to integrate testing into the instructional process as a formative rather than a summative tool. In the process of tending these major academic needs, the Helping Hands project took stock of two other correlates of intellectual development: learning style and class morale.

Background

The Helping Hands project takes much of its inspiration and many of its concepts from Walberg's seminal work on school productivity (Walberg, 1981, 1984). Drawing parallels between industrial and educational development, Walberg proposes a model for increasing the productivity of American schools. That model is structured around three premises: a) Practically all differences in academic outcomes can be explained in terms of differences in educational investments. b) The potential for educational investments exist outside of the formal channels of school; but, at this point in time the school and the social environment are often at cross-current with one another. c) The optimal way to bring about educational progress is to coordinate the various investments, i.e., consider them in combination rather than in isolation. The reason for this is that no variable is powerful enough by itself to determine achievement. From this point of departure, Walberg outlines three major factors to account for student performance: a factor of personal aptitude and individual development, a factor of instructional management, and an environmental factor which includes the school and the home. Each of these factors is represented by a number of leading educational indices retained from

Every instructional intervention must be multidimensional for no variable by itself is powerful enough to determine achievement.

the research literature because of their well established impact on learning. The list of leading educational indices, along with their most frequent statistical weight, is reported in Table 1 below.

From that list, 12 variables seemed to be particularly suitable for short-term investment, in the sense that they could be quickly and cheaply developed and put into place in the classroom to generate instructional intensity. These 12 variables are: reinforcement, cues and feedback, diagnostic/prescriptive methods, advance organizers, higher order questions, assigned homework, graded homework, cooperative learning, peer group, class morale, home environment, and television.

Personal Aptitude and Academic Need

To account for the factor of personal aptitude described by Walberg, information was provided to teachers regarding not only students' previous academic achievement, but also their general reasoning ability. Achievement was measured on the Comprehensive Tests of Basic Skills (CTBS, 1981) while reasoning ability was measured on the Raven Progressive Matrices (1951).

It cannot be overemphasized that test scores are first and foremost an indication of need, not of learning ability.

Although test scores have long been part of the educational process, they are most often used to

Table 1

Walberg's Productivity Model

Method	Effect	Size
Reinforcement	1.17	XXXXXXXXXXX
Acceleration	1.00	XXXXXXXXX
Reading Training	.97	XXXXXXXXX
Cues and Feedback	.97	XXXXXXXXX
Science Mastery Learning	.81	XXXXXXX
Cooperative Learning	.76	XXXXXXX
Reading Experiments	.60	XXXXX
Personalized Instruction	.57	XXXXX
Adaptive Instruction	.45	XXXX
Tutoring	.40	XXXX
Individualized Science	.35	XXXX
Higher Order Questions	.34	XXX
Diagnostic Prescriptive Methods	.33	XXX
Individualized Instruction	.32	XXX
Individualized Mathematics	.32	XXX
New Science Curricula	.31	XXX
Teacher Expectations	.28	XXX
Computer Assisted Instruction	.24	XX
Sequenced Lessons	.24	XX
Advance Organizers	.23	XX
New Mathematics Curricula	.18	XX
Inquiry Biology	.16	XX
Homogenous Groups	.10	X
Class Size	.09	X
Programmed Instruction	-.03	-.
Mainstreaming	-.12	-X.
Instructional Time	.38	XXXX
Graded Homework	.79	XXXXXXXX
Class Morale	.60	XXXXXX
Home Interventions	.50	XXXXX
Home Environment	.37	XXXX
Assigned Homework	.28	XXX
Socioeconomic Status	.25	XXX
Peer Group	.24	XX
Television	-.05	X.

Note: The X symbols represent the sizes of effects in tenths of standard deviations or correlations.

classify students rather than to enhance teachers' management of learning. In an effort to make the test information a more meaningful part of instruction, the Helping Hands team analyzed each student's CTBS scores in order to determine mastery or nonmastery of various subskills. Five levels of knowledge were defined in discussing each subskill:

- Full mastery - which means a student obtained the correct answer for 90 percent or more of the items pertaining to a subskill
- Partial mastery - which indicates that 75 percent to 90 percent of the relevant items were passed
- Knowledge - which corresponds to a success rate between 50 percent and 75 percent
- Partial familiarity - meaning that 30 percent to 50 percent of the items were answered correctly
- Total Unfamiliarity - which attests that a pupil knew less than 30 percent of the anticipated answers. In a multiple choice test with four options per item, that kind of performance is close to the chance level.

In reporting the test information to teachers, each subskill or instructional objective was further defined in respect to the predominant thinking process necessary for its mastery. According to the CTBS management guide, four main thinking processes underlie the reading comprehension and math concepts subtests: recall, recognition, inference, and evaluation. However, a more direct measure of each pupil's reasoning ability was obtained with the Raven Progressive Matrices. Since the content of the test is figural, it provided a measure of

perceptual and reasoning ability that is independent from word knowledge. It was conveyed to the teachers that such information could be of great practical significance not only for the proper assessment of bilingual or newly mainstreamed pupils; but also with the larger student population, it might be useful for obtaining a better understanding of differences in cognitive styles. Cognitive style designates the dominant strategy used by an individual to collect and process information from the environment. Unfortunately, the educational system has thus far paid little attention to such a factor; strict emphasis is placed on semantic competence and competitiveness. However, in light of the rate of underachievement observed in the schools, any other element that might facilitate learning should be worthy of consideration.

Cognitive style designates the dominant strategy used by an individual to collect and process information from the environment.

Instructional Quality

A) Homework

The program of weekly homework was the most important component of the Helping Hands project because it insured continuous involvement or "engagement" by the students. The reading homework assignments were based, for the most part, on the basal reader edited by Smith and Arnold (1983). The reading volumes for the intermediate grades are entitled: Full Circle,

Rhymes and Reasons, Echoes of Time, and Catch the Wind. These were supplemented by newspaper articles, short essays, and film transcripts. Six questions were developed on each passage reflecting the six comprehension objectives outlined above, namely: knowledge of word in context, retrieval of paragraph details, definition of a passage's main idea, understanding of possible generalizations, character analysis, and knowledge of literary techniques.

Items for the math homework assignments were adapted from the Holt Mathematics textbook edited by Nichols et al. (1981), Harcourt Mathematics textbook edited by May et al. (1981), and supplemented by the project's developers. Six items consistent with the problem solving objectives discussed earlier were presented for such assignment, numeration, number theory, numerical strategies for problem solving (number sentences), verbal strategies for problem solving (word problems), measurement, and geometry. As can be seen, this approach to homework presents all the major instructional objectives that are to be mastered for the year simultaneously, rather than sequentially. This is equivalent to a constant review process, which is possible and sensible because there is considerable overlap in the reading

The opportunity must be constantly provided for overlearning.

and math curriculum at the intermediate grade levels (from grade 3 to grade 6). The homework items serve as reinforcement for the objectives which students are familiar with; they operate as "advanced organizers" for the objectives which are being introduced in the current grade. Thus, the opportunity is constantly afforded for overlearning. The concept of overlearning articulated by Mandler and Guilford (1967) defines a degree of mastery at which comprehension is so great that answers to questions are almost automatic. It has been our experience that a certain measure of overlearning is necessary for good performance on a series of timed tasks such as a standardized test. In addition to that premise, the research team was guided by the following specifications in developing the homework assignments:

a) The homework must call upon students to construct rather than just select their answers to questions. In that way, insight could be gained regarding not only what the child has learned, but also what he/she has "mislearned."

b) The homework should give students the opportunity to utilize some mental processes other than memory and cognition. For instance, the reading assignment was seen as the kind of intervention that would positively affect not only the comprehension skills, but in the long run students' writing ability.

As pointed out by Walberg, it is not enough to assign homework, it must also be graded. The research team not only developed the homework

assignments, but also made provisions to grade them once they were returned by students, analyzed the results, and provided feedback to the teachers regarding individual pupil performance. Samples of homework are included in this report's Appendix.

B) Reinforcement

The second major feature of the Helping Hands project pertaining to instructional quality was a systematic reinforcement strategy. In his review, Walberg pointed to such a strategy as the most powerful predictor of educational achievement, i.e., the strongest component in the factor of instructional quality (b coefficient of 1.2). It has indeed become a tenet of educational wisdom that learning should be rewarding to the learner. But, as insightfully noted by Wallen and Travers (1963), there is little evidence that reinforcement is consistently resorted to in the day-to-day classroom transactions. Its value seems to be appreciated only by the primary grade teachers (K-2); and quickly disappears by the third or fourth grade. The intermediate and upper elementary school teachers tend to consider the use of reward as rather simplistic, but, there is more to reinforcement than a simple reward for a particular behavior. Although it is

Reinforcement should provide for both immediate and deferred gratification.

not specifically known "who is reinforced by what in a typical classroom which has children with a variety of backgrounds and abilities" (Wallen and Travers, p. 492), there are a number of general characteristics of reinforcement that have relevance to school learning.

1. The use of a reinforcer, even a symbolic one, should consistently follow the desired behavior until their relationship becomes unequivocal in the learner's mind.

2. Though praise may be, in most cases, a very efficient reinforcer, cognitive structuring or information about the standards, the rules, and one's results may play an equally powerful role.

3. A schedule of reinforcements should, whenever possible, provide for both immediate and deferred gratification.

The Helping Hands team translated these three principles into the following practical terms:

a) Satisfactory performance on both in-class and out-class work has to be consistently rewarded with stars of various colors.

As much as possible, feedback should include cues to the solution of items incorrectly answered.

Academic Performance	Symbol
A - Excellent 95-100	3 gold stars
B+ - Very Good 90-94	1 gold star
B- - Good 85-89	1 silver star
C+ - Satisfactory 75-84	1 blue star

b) Feedback was to be offered for each item of an assignment with cues to the solution of the items incorrectly answered by a student.

c) Each month, a student-of-the-month certificate was to be awarded to the student who had accumulated the greatest number of gold stars. This certificate was sent to the student's parents or guardian.

The systematic use of reinforcement is expected to have an impact on achievement because it contributes to the building of up a positive academic self-concept in students. But, it is only an indirect or partial way to deal with the noncognitive variables in the classroom. These variables, when neglected, may result in serious discipline problems; hence, teachers are held accountable for managing them properly in order for learning to take place. However, usually little help is offered to the teachers except for the usual advice to be tough and consistent in enforcing the rules. If a teacher is expected to be an instructional leader, he/she needs to develop leadership skills. As a beginning, he/she needs to understand the structure and dynamics of he group he/she is supposed to lead.

A classroom is a social entity, and learning is an interactional process

To assist the teacher in that task, the Helping Hands team proceeded with a sociometric study of each class participating in the project. The idea is that a classroom is a social entity, and that learning is an interactional process as has been suggested by many authors (Gronlund, 1959; Damrin, 1959; Thelen, 1950). The sociometric technique has been developed for the analysis of interactions among members of a group on relevant activities. Based on the choices made by the members, the

technique allows us to a) identify the potential leaders of the group as well as the students who are isolated, b) to determine the degree of cohesion or the openness in the group. For this project, each student was asked to name his/her preferred companions for five activities. Three of these activities were skill oriented and had to do with reading achievement, math achievement, and the completion of a general class project. The other two activities were fun oriented and dealt with athletics and recreation (see Appendix for a copy of the sociometric test).

If a teacher is expected to be an instructional leader, he/she needs to develop leadership skills.

Through this type of analysis, three or four subgroups were identified within each classroom clustered around popular leaders. a) It was suggested that each teacher make discipline a shared responsibility between himself/herself and these student leaders. b) The relation patterns of the more academically capable students were noted within the group. Teachers were encouraged to use that information to strengthen instructional grouping. In other words, instead of grouping students homogeneously based on previous achievement alone, a teacher could bring together in a subgroup students of differing ability but of like preferences. Thus, the way would be paved for peer tutoring and a

Discipline can become a shared responsibility between the teacher and student leaders

degree of convergence between cognitive and affective factors would ensue.

Environmental Factors

We have come to understand that full-fledge educational development cannot and should not be confined within the four walls of the classroom. Many of today's leading educators (Walberg and Bloom) have pointed to the fact that hardly one-third of the day is spent in school by the average youngster, and that the rest of the time is spent unsupervised on activities that are sometimes at cross-current with academic learning.

The Helping Hands project adopted the principle that the learning experience should be broadened and sustained beyond the classroom. To make that a reality, two mechanisms were put into place: one dealt with alternative sources of educational information, the other with parental involvement.

To broaden the learning experience beyond the classroom, alternative sources of information must be tapped. Television can be one of those sources.

The main source of structured information in the urban child's environment was thought to be television. Walberg estimated that most youngsters watch television for eight hours or more per week and that the impact of all that TV viewing, though modest, was negative (coefficient = -.05); he thus recommended a significant reduction in the number of hours students spent in front of the television set.

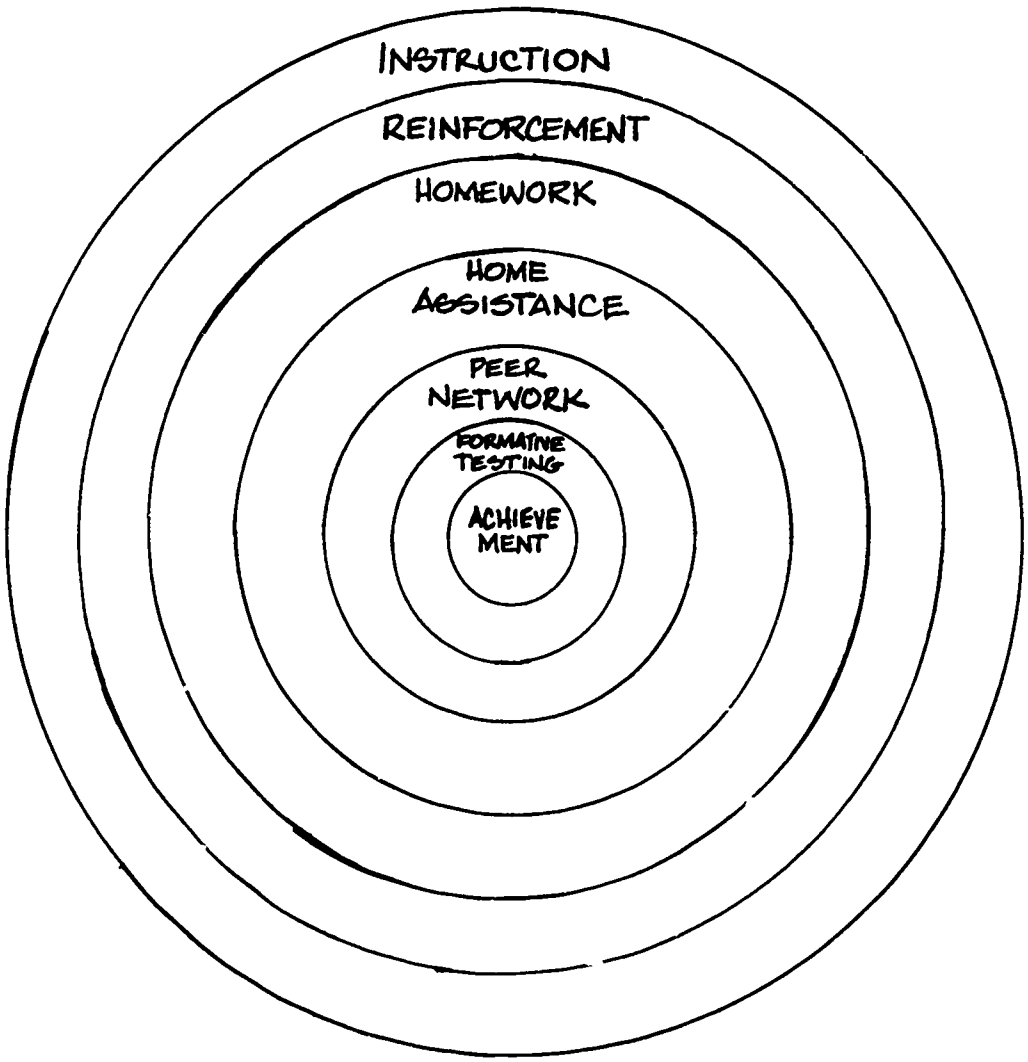
A more recent study for the NAEP found that the poor academic performers tended indeed to watch daily as much as four hours more of television than their more able classmates. However, instead of suggesting a drastic and unenforceable reduction in TV viewing, we considered using that time a little more productively. Television represents a mode (audio-visual) of presenting information quite different from the traditional classroom way (lecture). It makes extensive use of character analysis, a subskill involved in reading comprehension but particularly difficult for a student to master. Quite a few broadcasting stations, public or privately owned, offer short programs on topics related to science, mathematics, social studies, and the arts, for grades K to 12. Selecting from these programs, the Helping Hands team prepared a weekly educational TV guide that included three to six items. Frequent features in this guide were programs as "NOVA," "3-2-1 Contact," "Like It Is," etc. Parents were encouraged to watch and discuss these programs with their children whenever possible.

Another way to sustain academic learning is to facilitate parental monitoring of student's progress

The other mechanisms for sustaining academic learning called for greater continuity in parental monitoring of each student's progress. Every other

week, a report was to be sent to parents indicating teacher's satisfaction with the student's performance in eight areas: reading, math, writing, study skills, attentiveness, cooperativeness, discipline, and attendance. Each area was rated on a 5-point scale ranging from unsatisfactory to exemplary. That report was to be signed by the three educational partners: the teacher, the student, and the parent/guardian.

Figure 1 - The structure of academic development



Achievement is the core of academic development;

Instruction is the outer envelope;

The connecting tissues are: reinforcement, homework home assistance, peer network, and formative testing.

Implementation

Three weeks after the beginning of the school year, the initial contacts were made with the principals and teachers who had elected to participate in the project. It was emphasized that there would be no "hidden cost" to them: no new curriculum displacing the familiar one, no lengthy teacher training/ retraining, no "waste" of instructional time in extracurricular activities. The project sought to be as unobtrusive as possible. No effort was spared to develop a working relationship between the Helping Hands team and the teachers. A member of the research team met with each teacher every week for a minimum of 20 minutes. During these meetings, the researcher collected the weekly homework to be graded, returned the assignments from the previous week, and engaged in a discussion with the teacher about the academic program and adjustment of individual students as well as the class as a whole Specific items mastered or failed by a significant number of students were pointed out. Notes were taken of successful or faulty strategies repeated ~ used by students during information processing and problem solving. Periodically, at a teacher's request, the Helping Hands researcher would prolong the meeting and address the class directly, offering learning cues and feedback. During these appeals, one would also find out by show of hands and questioning how many students had watched one or more of the recommended educational television programs. The depth of understanding, the degree of interest, or the reasons for not watching those programs were discussed so that future selections could be made more appropriately. Finally, during the weekly meetings, data were collected on student attendance, and in this regard special concern was shown for those pupils who had been identified as isolates through the sociometric test.

Despite that kind of continuous exchange, not every feature of the Helping Hands project was implemented to its full extent. The most successful components were the homework program and the use of test data as a formative tool. A modification was introduced very early in the design of the homework program to alternate from week to week between reading comprehension and math problem solving, instead of having both assignments every week. Except for this slight change in plans, the homework program was faithfully adhered to from October to the end of May. When a student failed to complete an assignment at home, the teacher had him or her do it in class. Feedback from the homework as well as the objective mastery analysis of the CTBS and later on the MAT was used extensively by the teacher in drawing their lesson plans. The content of the lesson plan book was occasionally shared with the Helping Hands team to verify that kind of continuity.

Of the reinforcement system described earlier, two of the three aspects were consistently adhered to: the use of symbolic reward (stars) and the award of the Student-of-the-Month Certificate. The display of students' names and stars became a visible part of the classroom bulletin board. But, the use of cues on every item of classwork was not systematically kept.

There was a great deal of reluctance on the part of teachers to use their knowledge about interrelationships among students to strengthen classroom grouping. Students previous achievement was maintained as the overwhelming criterion for grouping; and it was not until late winter that some of the participating teachers came around to restructuring their subgroups. Equally unsuccessful was the implementation of the bi-weekly progress report to parents. This was considered to be the only interference of the project with the teaching routine. After the mid-year recess, no significant number of progress reports was sent home. Of those that were distributed, only 16

percent were returned with the parent's signature. As for the educational television programs, no formal mechanism had been put in place by the Helping Hands team to monitor actual viewing of the features. The informal follow through during class discussion indicated that, on the average, 60 percent of the students were watching at least one of the recommended programs. Surprisingly, the reason most often reported for not watching a particular segment did not have to do with interest level of the students, but competition with parents for television viewing time.

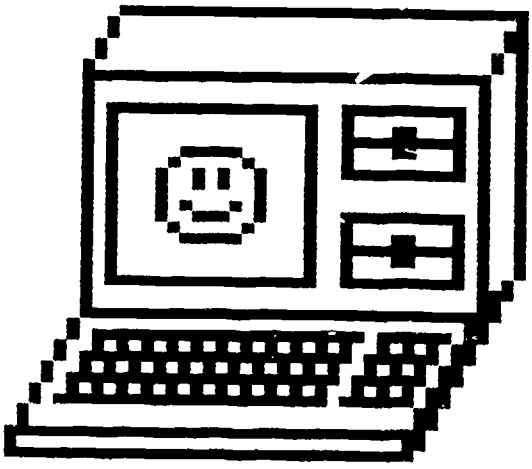
Setting

In October 1984, the project was implemented at two elementary schools whose principals volunteered after careful review of its features. The principals, along with their vice-principals, independently selected the participating classes at the intermediate grade levels (4 and 6). Five teachers were involved. Two of them had been teaching for two years or less; the remaining three had six or more years of teaching experience.

These teachers instructed in their class a total of 114 students. Sixty-seven were fourth graders, and forty-seven were sixth graders. Ethnically, the student population was markedly different from one school to the next. In one setting (that we will later refer to as school A), the student body presented great ethnic homogenity and was predominantly English-speaking. In the other setting (which will be designated as school B), there was a greater ethnic diversity; about one-third of the population was made up of bilingual students (Spanish, Portuguese, and Italian) who were recently mainstreamed. Instructionally, in four out of the five classes assigned to the project, students showed the full range of academic ability; but in one class, at the sixth grade level, only the low-achieving pupils already pulled out in a separate group received assistance from Helping Hands.

The participating classes lost 12 students during the course of the year. Five left for another school district before the beginning of December; one was transferred to another class within the same school; four were moved from the regular instructional program into a special education program for perceptually impaired children; and one quit the school in February 1985. The students who remained with the project were absent an average of 11 days for the year (number of days missed ranging from 0 to 31). Attendance varied among the teachers also; one teacher was absent for almost a month due to serious illness while another was commended in June for a full year of perfect attendance.

CHAPTER 2



MATH CONCEPTS & APPLICATIONS

In dealing with academic development, one of the objectives of the Helping Hands project was to help participating students significantly increase their proficiency and competitiveness in math concepts/applications. Proficiency meant that they would acquire greater mastery of many, if not all, of the subskills contributing to math problem solving. Competitiveness meant that they would reach a higher level than other students who had not received the Helping Hands assistance. Another specific frame of reference for the magnitude of the anticipated gain was derived from the work of Walberg. For each of the five major features of the Helping Hands project, one could find the estimated effect size most frequently reported in the literature; by averaging the various estimates, it was possible to arrive at a .67 change coefficient (expressed in tenths of standard deviations) for the combination of five variables included here. A change coefficient of that size would represent, of course, the optimal situation. However, as described earlier, since all the components of the Helping Hands project were not fully and equally implemented, the expectations were scaled down for a change of lesser magnitude.

Achievement in math concepts/applications was measured on the appropriate subtest of the Comprehensive Tests of Basic Skills (CTBS, 1981 edition) both before and after the Helping Hands intervention. A measure of students' prior skills in computation was also taken. This assessment process was conducted as part of the regular district testing program from spring to spring. Scale scores were used to indicate competitiveness. For proficiency the degree of mastery of each objective, derived from a Bayesian procedure developed by CTB/McGraw-Hill, was retained for the analysis: the mastery index was based

on "the probability of correctly answering a randomly chosen item from the hypothetical population of items measuring the objective" (CTBS Technical Report, 1982, p 15).

The analysis began with a needs assessment as reflected in student previous achievement. Then, in order to determine the effectiveness of the Helping Hands project, three types of analyses were conducted. First, the math concepts/applications test scores of the participants in the project were compared over a one-year period in order to determine any significant growth. That analysis was done using a paired t-test. Second, the growth was compared to that achieved by a control group of students from the same schools. Because of obvious differences in the test level, each grade was evaluated separately. At each school, the subjects for the control group were randomly selected from at least two other classes in order to palliate any possible teacher effect. An analysis of covariance procedure was applied to the data in which the 1985 concepts/applications scores served as the dependent variable; participation in the project as the independent variable, and the 1984 scores in computation and concepts/applications stood as covariates. The score difference between the two groups, after adjustment for the impact of the covariates, was used to calculate the effect size generated by the project. Such an effect size was expressed in tenths of standard deviations.

The third type of analysis is an assessment of change in the level of mastery of each instructional subskill. Since the mastery indices reported by the test developers are probabilities calculated from a Bayesian procedure, the same method was followed here. In the present application, the procedure was completed in three steps:

a) Theoretical mastery levels were defined for the pretest and the posttest. Because of changes in test level at each grade, a different mastery criterion was selected for each measure. At the fourth grade, a probability of .75 was retained for the pretest, while .85 was adopted for the posttest. At the sixth grade, where students were tested out of level on the posttest, the initial criterion was set at .85, while the regular .75 mark was kept for the posttest.

b) The actual mastery indices were calculated. Based on the parameters set above, and the actual distribution of scores from the sample, the "prior probabilities" and two sets of "posterior probabilities" were calculated. One of the latter was used to derive the expected mastery index.

c) The measure of change was derived by comparing the expected and posttest mastery scores. The probabilities attached to the expected mastery index and the posttest mastery index were used to obtain the "likelihood ratio." A ratio greater than 1 indicates a favorable outcome or gain.

Results

Grade 4

I - Needs Assessment

As part of the initial diagnostic process, a needs assessment of students deficiencies was conducted based on the test data from CTBS. The results from this process are tabulated and presented in Table 2.1 for both the fourth and sixth grades.

The results of the needs assessment process for this grade level suggested a high degree of proficiency by students in most of the skills tested on the concept and application subtest. The only skill deviating from this pattern was number theory. In fact, slightly more than a third of the participating students had no mastery of this skill. This mathematical skill as tested on the CTBS requires students, through a process of inferential reasoning, to demonstrate a knowledge of various rules that are applicable to all numbers. For example, the associative or distributive properties of numbers. It is interesting to note that the skills for reading comprehension that showed

Table 2.1

Math Concepts and Application Skills Mastery for Fourth and Sixth Grade Students Before Helping Hands Project

Math Concepts and Application Skills	Nonmastery		Partial Mastery		Mastery	
	4th Grade[a]	6th Grade[b]	4th Grade	6th Grade	4th Grade	6th Grade
Numeration	26.3	3.7	10.2	44.4	73.4	51.9
Number Sentences	4.1	3 7	4.1	33.3	91.8	63.0
Number Theory	36.7		26.5	48.1	36.7	63.0
Problem Solving	16.3	18.5	12.2	40.7	73.5	55.6
Measurement	12.2		16.3		75.5	
Geometry	6.1	22.2	6.1	55.5	87.8	22.2

[a]Number of students at 4th grade = 49
[b]Number of students at 6th grade = 27

weaknesses at the beginning of the project were also those requiring inferential reasoning.

II - Impact Data

A) At the fourth grade level, did the students participating in the Helping Hands project become more proficient in math concepts and applications? The answer to that question is "Yes." The evidence to support this claim is presented in Table 2.2. As can be seen from the table, these fourth graders had an average standard score of 640.72 (60th percentile rank) at the beginning of the school year, while on the posttest their average score was 669.57 SS (64 percentile rank). This represents a difference of 28 standard score points which exceeds the growth rate that one could have expected on the basis of the national norms for children of this ability level. The results of the correlated t-test statistically confirms the significance of this gain (α = .0001). There is a second point that is worth highlighting. Looking at the standard deviations of the two variables, one notices no reduction from pretest to posttest. This indicates that all the participants have improved in skill proficiency.

B) A second question now needs to be addressed. Did the students participating in the Helping Hands project at the fourth grade level gain more than they would have without the project? In other words, have they become more competitive in comparison to other children at their own school? The answer to that question is "Yes." The evidence in favor of this claim is presented in Table 2.3.

For each subgroup (treatment and control), the mean scores on the math concepts/applications pretest, the computation pretest, and the math concepts/applications posttest are reported along with their respective standard deviations. The key piece of information, however, is the difference

Table 2.2

Change in Math Concepts Achievement of Fourth Graders in Helping Hands Project

Test	Mean	SD	SEM	Diff	r	t	df	α
Pre	640.72	32.90	4.80	28.85	.395	5.41	46	.000
Post	669.57	31.34	4.57					

Table 2.3

Difference Between Treatment and Control Groups on Math Concepts Achievement at the Fourth Grade

Group	Mean	SD	Adj. Diff.	Covar. 1* F	α	B	Covar. 2* F	α	B	Treatment F	α	B
Helping Hands	669.6	31.3	+7.6	10.9	.001	.377	.09	.76	-.03	8.81	.004	.30
Control	650.5	21.5	-9.7									

*Covar 1 = math concepts
Covar 2 = computation

in posttest scores between the two groups adjusted for existing pretest variations. This information clearly shows that the Helping Hands participants outperformed the comparison group by no less than 17 standard score points. That figure is statistically significant at the .004 level. Converted into normal curve equivalents (NCE) it corresponds to a gain of 10 NCEs. The lead achieved by the participating students yields an effect size of .801. This is clearly beyond the average estimate derived from Walberg's paradigm (see beginning of this chapter) and more than twice the value ordinarily deemed satisfactory for educational significance.

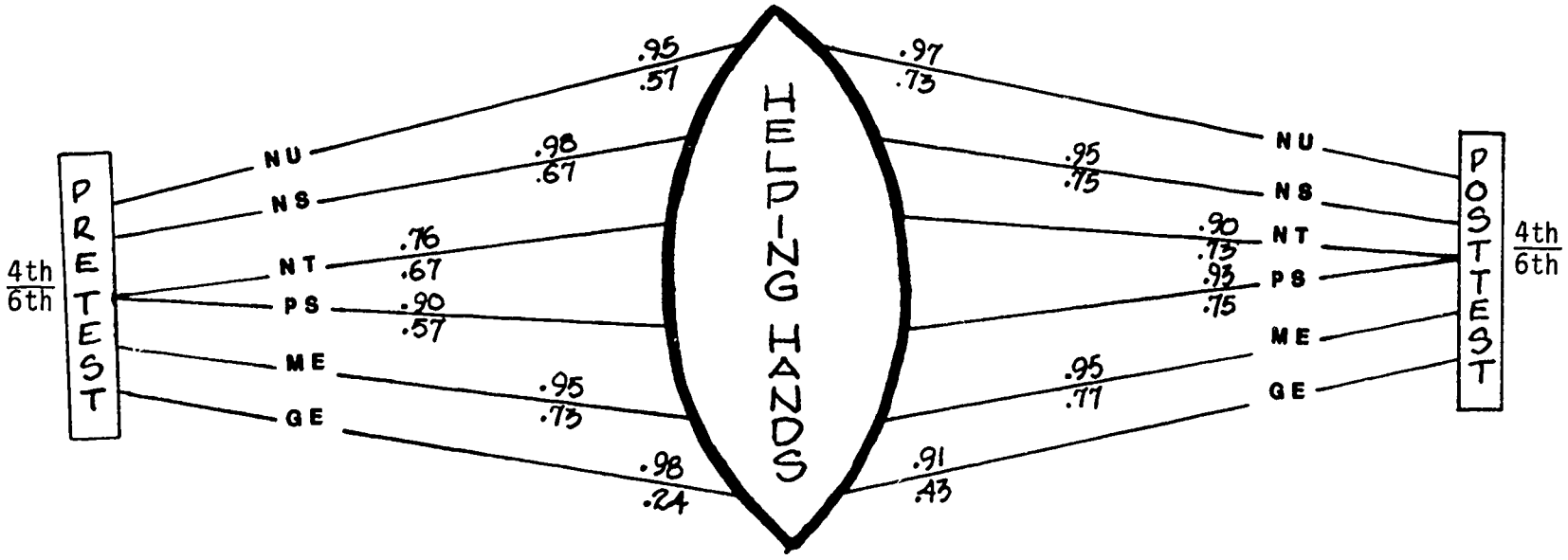
A further look at the data reveals an even more important point. By comparing the regression weights obtained for the three variables included in the analysis, one can see that the main factor of participation in the project has almost as strong a relationship to performance as previous achievement does (.30 versus .37). This is further indication that at this grade level and for this set of skills, a program like the Helping Hands can go a long way in accelerating academic development.

III - Objective Mastery

Given the intensive practice and instructional focus on the six mathematical skills, it was expected that students would, if not improve their mastery, at least maintain their mastery of these skills tested at a higher difficulty level. An analysis of students mastery scores at the end of the project year (see Table 2.4) indicates that this goal was met.

For numeration, students had a significant increase in their levels of proficiency on this skill. On number theory, the weakest area, the overall mean of the group went from partial mastery (.650) to complete mastery (.900) at the end of the school year. In all the other skill areas, with the exception of geometry, the proficiency levels went up. In the case of geometry,

Figure 2 - The HHP Lens for examining math achievement



From pretest to posttest, the Helping Hands Project (HHP) magnifies mastery of numerical concepts and applications.

NU=Numeration
NS=Number sentence
NT=Number theory
PS=Problem solving
ME=Measurement
GE=Geometry

the posttest mean was significantly lower than the pretest mean. Although the posttest mean had fallen, it nevertheless remained within the range of complete mastery suggesting that the decline witnessed might have represented a slight regression towards the mean given the high level of mastery at the start of the project.

Sixth Grade

I - Needs Assessment

The initial diagnostic process conducted at the sixth grade indicated slightly lower mastery levels for most of the skills than at the fourth grade. However, in the case of this grade level, one of the classrooms involved in the project contained only low ability mathematic students. The results of the needs assessment indicated that most of these students did have some partial knowledge of the various skills with the weakest skill being geometry. Both problem solving and numeration had proportionately fewer students attaining complete mastery than the remaining skills (see Table 2.1).

II - Impact Data

A) At the sixth grade level did the students participating in Helping Hands become more proficient in math concepts and application? The answer to that question is "Yes." The supportive evidence is presented in Table 2.5. As can be seen from that table, these sixth graders had an average standard score of 675.72 (48th percentile rank) at the beginning of the school year; on the posttest their average score was 697.69 SS (58th percentile rank). That is a difference of 22 standard score points which exceeds the growth rate that one could have expected on the basis of the national norms for children of this ability level. The results of the correlated t-test statistically confirms the significance of this gain ($\alpha = .05$). There is a second point worthy of interest. Looking at the standard deviations of the two variables, one

Table 2.4

Changes in Mastery Levels of Math Concepts and Application Skills: Grade 4

Subskills	Pretest Mastery	Expected Mastery	Post Mastery	Prior Ratio	Post Ratio	Likelihood
Numeration	.92	.95	.97	3.03	5.25	1.73
Number Sentence	.98	.98	.95	8.35	3.55	.42
Number Theory	.65	.76	.90	.56	1.56	2.81
Problem Solving	.85	.90	.93	1.57	2.23	1.42
Measurement	.94	.95	.95	3.55	3.17	.89
Geometry	.98	.98	.91	8.35	1.86	.22

Table 2.5
Change in Math Concepts Achievement of Sixth Graders in Helping Hands Project

Test	Mean	SD	SEM	Diff	r	t	df	α
Pre	675.72	23.78	4.20	21.97	.559	6.30*	31	.000
Post	697.69	12.39	2.19					

notices a reduction from pretest to posttest. This indicates that the group became more homogeneous in terms of proficiency. Furthermore, the initially weaker participants may have experienced the greater improvement in skill proficiency. That kind of homogeneity should facilitate instruction in the next higher grade.

B) A second question now needs to be addressed. Did the students participating in the Helping Hands project at the sixth grade level gain more than they would have without the project? In other words, have they become more competitive in comparison to other children at their own school? The answer to that question is "Yes." The evidence regarding this point is presented in Table 2.6.

For each subgroup (treatment and control), the mean scores on the math concepts/application pretest, the computation pretest, and the math concepts/-applications posttest are reported along with their respective standard deviations. The key piece of informationin the table, however, is the difference in posttest scores between the two groups adjusted for existing pretest variations. This clearly shows that the Helping Hands participants outperform the comparison group by no less than 9.5 standard score points. That figure is statistically significant at the .006 level. Converted into normal curve equivalents (NCE) it corresponds to a gain of 7 NCEs. The lead achieved by the participating students yields an effect size of .718. That is clearly beyond the average estimate derived from Walberg's paradigm (see earlier discussion of this criterion) and more than twice the value ordinarily deemed satisfactory for educational significance.

A further look at the data reveals a more important point. By comparing the regression weights obtained for the three variables included in the analysis, one can see that the main factor of participation in the project has

a stronger relationship to performance than previous achievement does (.35 versus .26). This is further indication that at this grade level and for this set of skills, a program like Helping Hands can go a long way in accelerating academic development.

III - Objective Mastery

The goal of the Helping Hands project was to help the students involved in the program improve their mastery of these skills and at the same time reduce the proficiency gap between the more successful and less successful students.

The data reported for the sixth grade in Table 2.7 indicates that most students made progress towards mastery of these skills, whereas the expectation was that most students would have attained only partial mastery, at the end of the year most had reached complete mastery. For geometry incremental signs of improvement were also evident, although mastery was still not reached.

It is of interest to note that for all the skills tested the program was able to successfully reduce the gap between the initially more proficient and less proficient students. Of particular noteworthy attention are the areas of problem solving and number sentence. In the case of number sentence, although the improvement was not as great as the other skills (which had shown improvement) the variation in the scores had shrunken significantly. One reason for this might have been the carry-over effects from the number sentence cues given on the problem solving questions on the homeworks. Similarly, these cues helped to reduce the gap between the more successful and less successful problem solvers.

Table 2.6

Difference Between Treatment and Control Groups in Math Concepts Achievement at the Sixth Grade

Group	Mean	SD	Adj Diff	Covar 1* F	Covar 1* α	Covar 1* B	Covar 2* F	Covar 2* α	Covar 2* B	Treatment F	Treatment α	Treatment B
Helping Hands	697.7	11.5	+4.14	10.9	.002	.26	.008	.927	-.007	8.18	.006	.35
Control	685.2	13.3	-5.40									

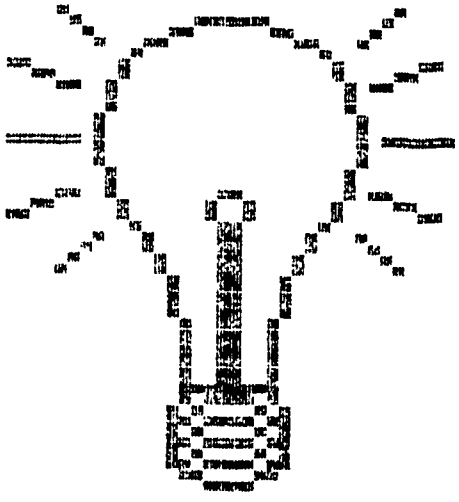
*Covar 1 = math concepts
Covar 2 = computation

Table 2.7

Changes in Mastery Levels of Math Concepts and Application Skills: Grade 6

Subskills	Pretest Mastery	Expected Mastery	Post Mastery	Prior Ratio	Post Ratio	Likelihood
Numeration	.74	.57	.73	.45	.89	1.97
Number Sentence	.81	.67	.75	.68	1.00	1.47
Number Theory	.81	.67	.73	.68	.89	1.31
Problem Solving	.74	.57	.75	.45	1.00	2.22
Measurement	.85	.73	.77	.89	1.13	1.27
Geometry	.39	.24	.43	.10	.25	2.51

CHAPTER 3



READING FOR UNDERSTANDING

The second objective pertaining to academic development was to help participating students significantly increase their proficiency and competitiveness in reading comprehension. The same criteria used to assess progress in math were also adopted here: that included measures of growth and competitiveness as well as an estimate of the production function. Achievement in reading comprehension was measured on the appropriate subtest on the CTBS both before and after the Helping Hands intervention. Scores on prior knowledge of vocabulary were added to the data set. Scale scores were used to indicate competitiveness. For proficiency, the degree of mastery of each instructional objective was retained: the mastery index represented "the probability of correctly answering a randomly chosen item from the hypothetical population of items measuring the objective" (CTBS Technical Report, 1982, p. 15).

The analysis began with a needs assessment as reflected in student previous achievement. Then, in order to determine the effectiveness of the Helping Hands project, three types of analyses were conducted. First, the comprehension test scores of the participants in the project were compared over a one-year period in order to determine any significant growth. That analysis was done using a paired t-test. At the second stage, this growth was compared to that achieved by a control group of students from the same schools. Because of obvious differences in the test level, each grade was evaluated separately. At each school, the subjects for the control group were randomly selected from at least two other classes in order to palliate any possible teacher effect. An analysis of covariance procedure was applied to the data in which the 1985 reading comprehension scores served as the dependent variable, participation in the project as the independent variable, and the 1984 scores in vocabulary and reading comprehension stood as covariates. The score difference between the two groups, after adjustment for

the impact of the covariates, was used to calculate the effect size generated by the project. Such an effect size was expressed in tenths of standard deviations.

The third type of analysis is an assessment of change in the level of mastery of each instructional subskill. Since the mastery indices reported by the test developers are probabilities calculated from a Bayesian procedure, the same method was followed here. In the present application, the procedure was completed in three steps:

a) Theoretical mastery levels were defined for the pretest and the posttest. Because of changes in the test level at each grade, a different mastery criterion was selected for each measure. At the fourth grade, a probability of .75 was retained for the pretest, while .85 was adopted for the posttest. At the sixth grade where students were tested out of level on the pretest, the initial criterion wast set at .85 while the regular .75 mark was kept for the posttest.

b) The actual mastery indices were calculated. Based on the parameters set above, and the actual distribution of scores from the sample, the "prior probabilities" and two sets of "posterior probabilities" were calculated. One of the latter was used to derive the expected mastery index.

c) The measure of change was derived by comparing the expected and posttest mastery scores. The probabilities attached to the expected mastery index and the posttest mastery index were used to obtain the "likelihood ratio." A ratio greater than 1 indicates a favorable outcome or gain.

Results

Grade 4

I - Needs Assessment

Since the "Helping Hands Project" represented an attempt to not only build up but remedially rectify skills that were problematic for participating students, one of the first activities that was carried out was a needs assessment based on students performance on the CTBS. This process focused on identifying for each grade level the comprehension skills with apparent deficiencies. The results from this analysis are tabulated and presented in Table 3.1.

Table 3.1

Comprehension Skills Mastery for fourth and Sixth Grade Students Before Helping Hands Project

Comprehension Skills	Nonmastery		Partial Mastery		Mastery	
	4th Grade[a]	6th Grade[b]	4th Grade	6th Grade	4th Grade	6th Grade
Passage Details	20.4	16.7	32.7	23.3	49.0	60.00
Character Analysis	10.2	16.7	26.5	33.3	63.3	60.0
Main Idea	24.5	16.7	36.7	13.3	38.7	63.3
Generalization	22.4	23.3	28.6	20.0	49.0	56.7
Written Forms	8.2	26.7	14.3	13.3	77.5	60.0
Writing Techniques[c]	-	6.7	-	30.0	-	63.3

[a]Number of students at 4th grade = 49
[b]Number of students at 6th grade = 30
[c]This skill is not tested at the fourth grade.

Of the five comprehension skills they were expected to master on entering the fourth grade, students showed definite signs of weakness in three areas. These were: 1) being able to identify the main idea of a passage; 2) being able to draw generalizations based on the information contained in a passage; 3) and being able to extract details from a given passage. Of the three skill deficiencies, the ability to understand the main idea of a passage was the weakest. At least 60 percent of the participating students demonstrated only partial mastery of, or no mastery of this skill. The percentage of students proficient in the other two problem areas were 49 percent respectively; however, a slightly larger percentage had some partial mastery of passage details than generalizations. This pattern of skill deficiencies suggested that participating fourth graders in the program had problems with higher order cognitive thinking processes and, in particular, inferential reasoning and explicit information skills.

II - Impact Data

A) Did the students participating in the Helping Hands project become more proficient in reading comprehension? The answer to that question is "Yes." The evidence to support this claim is presented in Table 3.2. As can be seen from the table, these fourth graders had an average standard score of 599.60 (33rd percentile rank) at the beginning of the school year; while on the posttest, their average score was 656.75 (41 percentile rank). This represents a difference of 57 standard score points which exceeds the growth rate that one could have expected on the basis of the national norms for children of this ability level. The results of the correlated t-test statistically confirms the significance of this gain ($x = .0001$). There is a second point that is worth highlighting. Looking at the standard deviations of the two variables, one notices a reduction from pretest to posttest. This

indicates that the group has now become more homogeneous. That kind of homogenity should facilitate instruction in the next higher grade.

Table 3.2

Change in Reading Comprehension Achievement of Fourth Graders in Helping Hands Project

Test	Mean	SD	SEM	Diff	r	t	df	α
Pre	599.6	45.10	6.58	57.17	.55	10.06	46	.0001
Post	656.77	35.62	5.20					

B) A second question now needs to be addressed. Did the students participating in the Helping Hands project at the fourth grade level gain more than they would have without the project? In other words, have they become more competitive in comparison to other children at their own school? The answer to that question is yes. The evidence in favor of this claim is presented in Table 3.3.

Table 3.3

Difference Between Treatment and Control Groups in Reading Comprehension Achievement at the Fourth Grade

Group	Mean	SD	Adj Diff	Covar 1* F	Covar 1* α	Covar 1* B	Covar 2* F	Covar 2* α	Covar 2* B	Treatment F	Treatment α	Treatment B
Helping Hands	656.8	35.6	+12.7	17.5	.000	.39	1.32	.25	-.14	12.7	.001	.35
Control	638.4	42.4	-15.4									

*Covar 1 = Reading Comprehension
Covar 2 = Vocabulary

For each subgroup (treatment and control), the mean scores on the reading comprehension pretest, the vocabulary pretest, and the reading comprehension posttest are reported along with their respective standard deviations. The key piece of information, however, is the difference in posttest scores between the two groups adjusted for existing pretest variations. This clearly shows that the Helping Hands participants outperformed the comparison group by no less than 28 standard score points. This figure is statistically significant at the .001 level. Converted into normal curve equivalents (NCE) it corresponds to a gain of 4 NCEs. This kind of return from the project is particularly remarkable considering that on the pretest measure the control group students were slightly ahead (though not significantly so). The lead achieved by the participating students yields an effect size of .664. This is within a point of the average estimate derived from Walberg's paradigm (see preceding chapter of this report) and twice the value ordinarily deemed satisfactory for educational significance.

A further look at the data reveals an even more important point. By comparing the regression weights obtained for the three variables included in the analysis, one can see that the main factor of participation in the project has almost as strong a relationship to performance as previous achievement does (.35 versus .39). This is further indication that at this grade level and for this set of skills, a program like the Helping Hands can go a long way in accelerating academic development.

III - Objective Mastery

With the intensive homeworks coupled with feedback given to the teachers by the project team on students' progress, and focused classroom instruction, it was expected that at the end of the year students would have made significant advancement towards mastery of all comprehension skills. Table 3.4 pre-

sents the results from the analysis of students mastery scores for each comprehension skill. As is starkedly evident from the data, students made significant improvement in the mastery of the three problem skills. For all three skills, the pretest mean for the groups fell toward the lower end of the mastery range. At the end of the school year, the posttest means for all three skills were high in the mastered band. The program was particularly successful in improving students' proficiency in main idea. However, not only did the program result in successful mastery of these skills by most students, but it also brought the mastery levels of the initially poorer readers closer to the levels of the more proficient readers hence reducing the variation in mastery level evident among students at the beginning of the program.

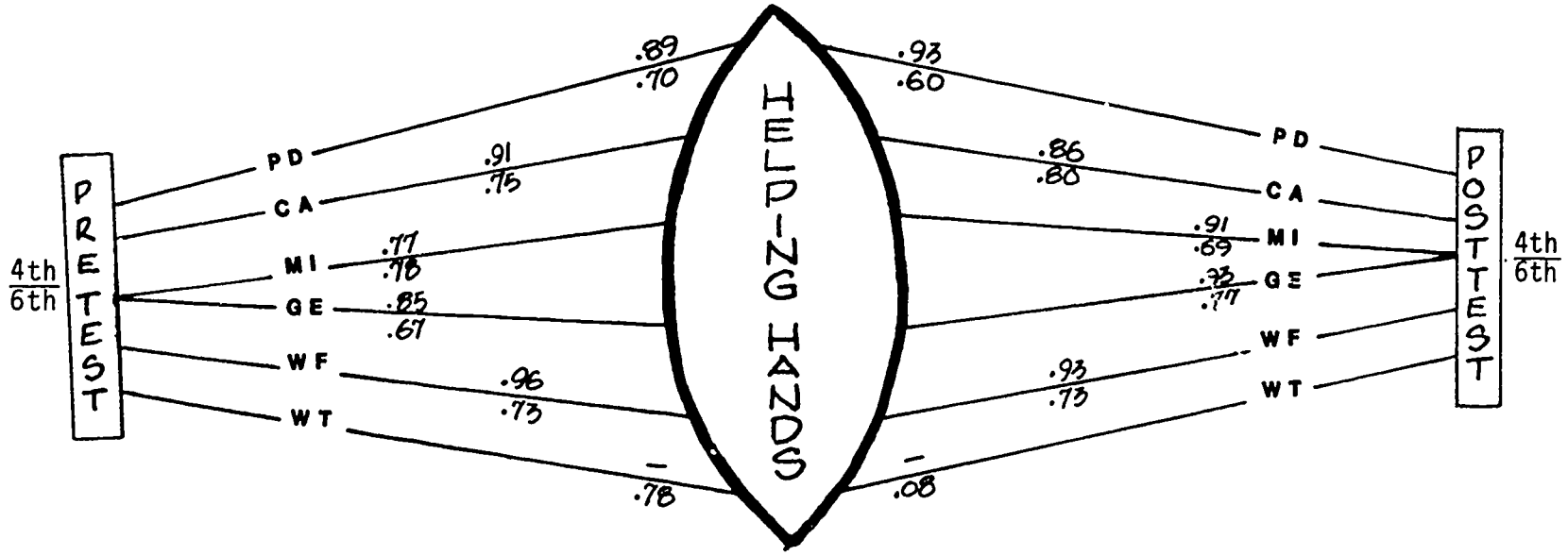
For the other two skill areas, character analysis and written forms, students maintained on the average their mastery of these skills. Although the posttest mean fell slightly for character analysis, the posttest mean still laid within the mastery range.

Table 3.4

Changes in Mastery Levels of Reading Comprehension Subskills: Grade 4

Subskills	Pretest Mastery	Expected Mastery	Post Mastery	Prior Ratio	Post Ratio	Likelihood
Passage Details	.77	.89	.93	1.45	2.23	1.53
Character Analysis	.86	.91	.86	1.77	1.04	.59
Main Idea	.67	.77	.91	.60	1.70	2.83
Generalizations	.77	.85	.93	.99	2.23	2.24
Written Forms	.96	.96	.93	4.79	2.23	.46

Figure 3 - The HHP Lens for examining reading achievement



From pretest to posttest, the Helping Hands Project (HHP) magnifies mastery of comprehension subskills.

PD=Passage details
CA=Character analysis
MI=Main idea
GE=Generalizations
WF=Written forms
WT=Writing technique

Grade 6

I - Needs Assessment

At the sixth grade level, the initial diagnostic process indicated skill needs in generalization, passage details, and written forms. Although on the average, at least 60 percent of the students entering the sixth grade had demonstrated proficiency in most of the comprehension skills, at least 40 percent had only partial mastery or no mastery of the three problem skills. Most of these skill deficiencies existed among the bilingual students in the project, many of whom were recently mainstreamed into the regular program. This contributed to the complexity of the project at this grade level (see Table 3.1).

II - Impact Data

A) At the sixth grade level did the students participating in Helping Hands become more proficient in reading comprehension? The answer to that question is "Yes." The evidence to support this claim is presented in Table 3.5 below. As can be seen from the table, these sixth graders had an average standard score of 691.59 (30th percentile rank) at the beginning of the school year; at posttest time their average score was 712.12 SS (33rd percentile rank). This represents a difference of 20 standard score points which exceeds the growth rate that one could expect on the basis of the national norms for students of this ability level. The results of the correlated t-test statistically confirms the significance of this gain ($\alpha = .05$). There is a second point that is worth highlighting. Looking at the standard deviations of the two variables, one notices a reduction from pretest to posttest. This kind of homogeneity should facilitate instruction in the next higher grade.

B) A second question now needs to be addressed. Did the students participating in the Helping Hands project at the sixth grade level gain more than

they would have without the project? In other words, have they become more competitive in comparison to other children at their own school? The answer to that question is "No." The evidence regarding this point is presented in Table 3.6.

Table 3.5

Change in Reading Comprehension Achievement of Sixth Graders in Helping Hands Project

Test	Mean	SD	SEM	Diff	r	t	df	α
Pre	691.59	49.44	8.48	20.53	.11	2.03	33	.05
Post	712.12	38.10	6.53					

Table 3.6

Difference Between Treatment and Control Groups in Reading Comprehension Achievement at the Sixth Grade Level

Group	Mean	SD	Adj Diff	Covar 1* F	Covar 1* α	Covar 1* B	Covar 2* F	Covar 2* α	Covar 2* B	Treatment F	Treatment α	Treatment B
Helping Hands	712.1	38.1	+1.05	.222	.639	.035	11.8	.001	.49	.057	.81	.029
Control	707.2	32.3	-1.37									

*Covar 1 = reading comprehension
Covar 2 = Vocabulary

For each subgroup (treatment and control), the mean scores on the reading comprehension pretest, the vocabulary pretest, and the reading comprehension posttest are reported along with their respective standard deviations. The key bit of information, however, is the difference in posttest scores between the two groups adjusted for existing pretest variations. That information clearly shows that the Helping Hands participants outperform the comparison group by less than 2.5 standard score points. However, this figure is not statistically significant at the .05 level. Converted into normal curve equivalents (NCE) it corresponds to a gain of only 1 NCE. The lead achieved by the participating students yields an effect size of .08. That is far below the average estimate derived from Walberg's paradigm (see first chapter of this report) and only one-fourth the value ordinarily deemed satisfactory for educational significance.

A further look at the data reveals, however, an important point. By comparing the regression weights obtained for the three variables included in the analysis, one can see that the main factor of participation in the project has almost as weak a relationship to performance as previous achievement does (.035 versus .030). What emerges as the only significant variable is word knowledge. This strongly suggests a qualitative change in the test itself from one level (F) to the other (G). At this grade level, a more sophisticated vocabulary is necessary in order to successfully process and comprehend the information presented in the passages. Not having anticipated that kind of qualitative change, the Helping Hands project concentrated on the comprehension subskills and thus missed the target.

What are the reasons for this shortcomings at the sixth grade? The explanation can take us into two directions:

a) The major cause probably lies with the failure of the project to provide for extensive vocabulary development, especially when one considers the relatively high proportion of (newly mainstreamed) bilingual students at this grade level. As mentioned earlier, vocabulary turned out to be a better predictor of present achievement in reading comprehension than prior comprehension skills were.

b) Because one class representing more than 40 percent of the participating sixth graders, included only low-achieving youngsters, the regular instruction they received may not have covered all the instructional objectives measured by the CTBS. The exposure to those objectives, offered through the Helping Hands project, was insufficient to yield anything other than the marginal improvement we observed. An analysis of the change on objectives mastery from pretest to posttest may now help determine which ones were strengthened and which ones were not.

III - Objectives Mastery

Similar to the focus adopted by the project team at the fourth grade, these students were given intensive homework on comprehension skills. Constant feedback based on their homework performances was given to the classroom teachers along with suggestions on the skills in need of instructional focus.

At the end of the year, students had made some progress towards improving their mastery levels in generalization and character analysis; they also showed some slight decrease in passage details. In the latter skill, although the posttest mean was lower than the pretest mean, it nevertheless remained within the same partial mastery range as was the pretest mean.

For the other comprehension skills there also were declines in mastery levels with significant drops in the proficiency levels for writing techniques and main idea. Because of such significant changes, an examination of the content of the two test levels used to obtain the pretest and posttest scores was conducted. On the basis of this, a number of factors emerged which partially may account for these declines.

First of all, for the comprehension skill writing techniques, based on data provided by the publishing company, on average fewer students are able to pass this skill at the sixth grade than at the fifth grade. For example, at the fifth grade level, on average, 73 percent of students in the group on which the CTBS was normed passed this skill objective. At the sixth grade, however, the percentage of students successfully passing this skill in the normed group dropped to 58 percent, suggesting therefore that this is a typically difficult skill for sixth graders nationwide.

Second, and in more specific terms, it would appear that students experience more difficulties with imagery and other figurative ideas expressed in methaphoric terms than with those ideas expressed as hyperboles. For example, most of the figurative writing techniques on which students were tested at the fifth grade were hyperboles within the context of idioms. However, at the sixth grade most of the items were on methaphors and imagery tested in the context of poetry. It, therefore, seems that both the specific techniques tested as well as the context in which they were tested significantly affected the students' ability to successfully master this skill.

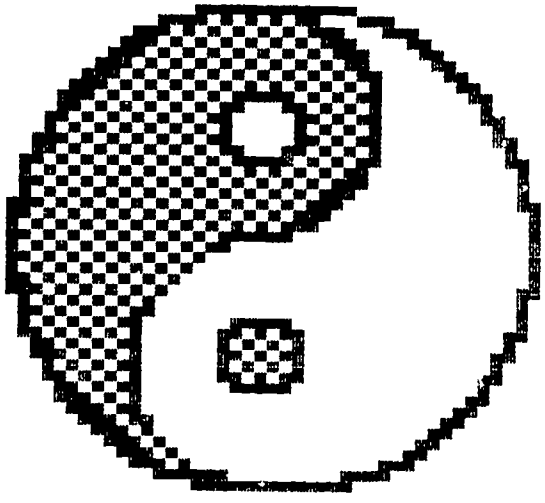
For main idea, two new subskills were introduced at the sixth grade: author's viewpoint and tone or mood. However, these subskills were not given intense instructional focus as were the other subskills comprising this

objective, and this may have contributed to the decline in mastery levels for this objective.

Table 3.7
Changes in Mastery Level of Reading Comprehension Subskills: Grade 6

Subskills	Pretest Mastery	Expected Mastery	Post Mastery	Prior Ratio	Post Ratio	Likelihood
Passage Details	.83	.70	.60	.79	.49	.62
Character Analysis	.86	.75	.80	.99	1.33	1.34
Main Idea	.88	.78	.69	1.15	.75	.65
Generalization	.81	.67	.77	.68	1.13	1.66
Written Forms	.85	.73	.73	.89	.89	1.00
Writing Techniques	.88	.78	.08	1.15	.03	.03

CHAPTER 4



AFFECTIVE & ACADEMIC SIDES OF ADJUSTMENT

It was noted earlier that the management of learning to be effective, has to facilitate a convergence of students' cognitive and affective behaviors. This premise is rooted in the work of many educational psychologists (Bloom, 1976; Condon, 1978; Heath, 1972; Maslow, 1968). These authors have further taught us to analyze school-related affect into two subcomponents: a factor of socio-emotional development and a metacognitive or learning-oriented factor. An earlier study in this school district (Madhere and Walker, 1985) has established the importance of each of these affective factors for students receiving compensatory education. The Helping Hands project has unearthed some new evidence. This evidence pertains to three areas: student attendance, mobility, and academic performance.

Patterns of interrelationships among students reveal the degree of cohesion in the classroom and the possibility for cooperative learning.

In studying affectivity in the classroom, we focused on student patterns of interrelationships. Why are those patterns important? Because they directly reflect the degree of social acceptance for each individual student, the level of class morale, and the possibility for cooperative learning. These

From the student point of view, social development is as important as academic achievement.

interrelationships were assessed via a sociometric task called the Friendship Test. From this test it was possible to obtain two measures of student integration or social acceptance. One was skill oriented (reflecting perceived status in reading, math, and other class performances), the other was fun oriented (touching upon status attained because of attractiveness or athletic ability). By combining the number and the order of choices received by a student, it was possible to make the two integration measures sensitive to both popularity and feeling intensity.

Using regression analysis and a t-test the integration indices were first related to student absenteeism, measured as the number of school days missed for the entire year; then to mobility, coded as a dichotomous variable to indicate whether a student remained in or left the school; and finally to achievement in reading comprehension and math concepts/applications.

Absenteeism

The first set of analyses involved a group of students who had been at the same school for at least two consecutive years, and thus had sufficient time to know one another. The expression of preferences could be expected to be more meaningful for them

than it would be for other students relatively new to this social environment. The two measures of social acceptance (skill and fun) served as independent variables to explain variations in student absenteeism which has traditionally been considered symptomatic of school maladjustment. A multiple regression procedure was applied to determine the strength of the relationship. As shown in Table 4.1 below, this yielded an overall coefficient of determination (R^2) of .108, significant at the .03 level. The size of the coefficient may appear to be modest. But, to fully understand the implications of this finding, one has to remember that absenteeism is known to negatively impact on academic achievement, especially in mathematics and other subject matters where instructional continuity is a must. Therefore, when a factor is found to be responsible, even in a modest way, for absenteeism one can see its repercussions on academic development.

Students who do not gain active membership in the peer group will tend to absent themselves from school.

Of the two predictors included in the equation, only one contributed significantly to the relationship with a regression coefficient (beta) of -.329. The second one, though pointing in the same downward direction, did not reach statistical significance. Substantively, this means that the more limited the

It is not the more academically successful students who have the best attendance record, but the ones with the strongest supportive network.

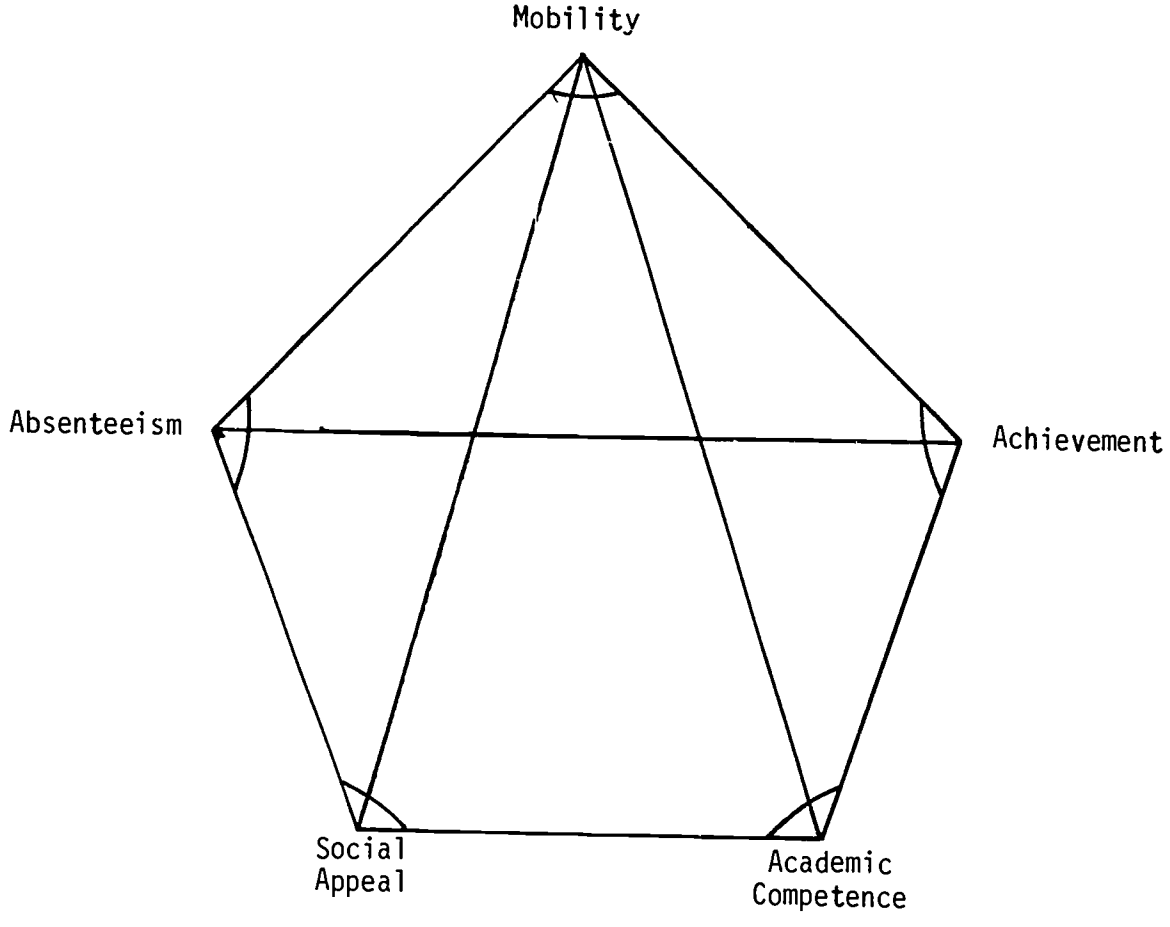
social acceptance received by a student from his/her peers, the more often he/she tends to be absent from class. Given that it is the fun variable rather than the skill variable which carries the strongest weight, this further suggests that the socio-emotional dimension takes precedence over the meta-cognitive dimension in determining attendance, the minimal criterion of adjustment to school. It remains to be seen whether this relationship would hold with such other criteria as student mobility and performance.

Table 4.1

Regression of Total Year - Absenteeism on Two Peer Acceptance Variables

Variables Source	b	SE	B	F	α	Total R	R^2	F	α
Skill	-.16	.13	-.20	1.39	.24	.339	.109	6.15	.03
Fun	-.42	.19	-.33	4.96	.031				
Constant	10.9	1.32		68.1	.000				

Figure 4 - The various angles of academic adjustment



How many triangles can you see in this figure?

How many facets can you see...in student adjustment?

Mobility

For the second set of analyses, two groups were constituted. All the pupils who had transferred out of the schools or classes participating in the project were classified as mobile. The other students who remained at the schools for the entire year were designated as stable. This stability - mobility dimension became the independent variable of interest. Although there were no achievement posttest scores for students in the mobility group, the integration measures taken at the beginning of the year were available for them. These measures were used as dependent variables. The analysis sought to determine whether students who had left the participating schools differed in social acceptance from those who remained. The results of the analysis are presented in Tables 4.2 and 4.3. As can be seen on the skill dimension, the stable group had a mean score of 7.10 compared to a mean of 1.71 for the mobile group. The t-test value showed this difference to be highly significant (α = .0001). Similarly, on the fun related dimension, the stable group received a mean score of 4.86 in comparison to a mean of 1.05 for the mobile group. The t-test value established such sizeable differences to be statistically significant (α = .0001). The consistency of this pattern con-

Table 4.2

Difference in Degree of Peer Acceptance (Skill) Between Groups of Stable and Mobile Students

Group	Mean	SD	SEM	Diff	t	df	∝
Stable	7.10	8.21	.90	5.39	4.98	24	.001
Mobile	1.71	2.55	.60				

Table 4.3

Difference in Degree of Social Appeal (Fun) Between Groups of Stable and Mobile Students

Group	Mean	SD	SEM	Diff	t	df	∝
Stable	4.86	5.22	.57	3.81	5.41	24	.000
Mobile	1.05	1.74	.41				

Socio-emotional standing within the classroom, not just socio-economic factors outside the school play a role in student turnover or transiency.

firms that students who are not well liked in a school setting will tend to emigrate toward another environment. Another possibility is that they will become so disruptive or their classroom performance will be so unsatisfactory that teachers will have them transferred out. One begins to see the link between classroom integration, discipline, and student mobility. It has been documented that mobility or class turnover represents a serious educational problem in urban school districts. Many forms of turnover have been associated with the socio-economic status of a segment of the student population. What the present research shows is that at least partially, turnover is also dependent upon the socio-emotional standing of a student within the classroom.

Achievement

Achievement remains the optimal criterion of adjustment to school. Thus, it is important to determine to what extent it is dependent on affectivity in general, and peer group relationship in particular. The two measures of social acceptance served once again as independent variables. The analysis aimed at determining whether students who had been granted recognition by their peers lived up to those expec-

tations and obtained the higher scores. The relationship was studied separately for reading and for math. With the reading comprehension skill (Table 4.4) the multiple regression procedure resulted in a coefficient of determination (R^2) of .140, which was significant at the .006 level. The impact was strictly due to one of the predictors (the skill related variable) with a coefficient of .374. This suggests that, even in these early grades, students do make a distinction between academic competence and social appeal. Furthermore, they tend to be accurate in their assessment in that perceived competence matches, to a degree, actual performance.

Table 4.4

Regression of Reading Comprehension Achievement on Two Measures of Peer Acceptance

Variable Source	b	SE/b	B	F	α	R	R^2	Total F	α
Fun	2.07	1.64	.10	.42	.52	.37	.14	8.15	.006
Skill	7.10	2.49	.37	8.15	.006				
Constant	668.4	8.53		6146.3	.0000				

N=54

A similar pattern was observed for math concepts applications (Table 4.5). The coefficient of determination equaled . 085, resulting in a .044 significance level. Once again, only one of the variables was responsible for that contribution with a regression coefficient of .292. This suggested that the greater the amount of recognition, the greater the achievement in numerical problem solving.

Table 4.5

Regression of Math Concepts Achievement on Two Measures of Peer Acceptance

Variable Source	b	SE/b	B	F	α	R	R^2	F	α
Fun	-.85	2.02	-.07	.17	.68	.29	.085	4.30	.04
Skill	3.49	1.68	.29	4.29	.04				
Constant	675.3			16671.7					

N=54

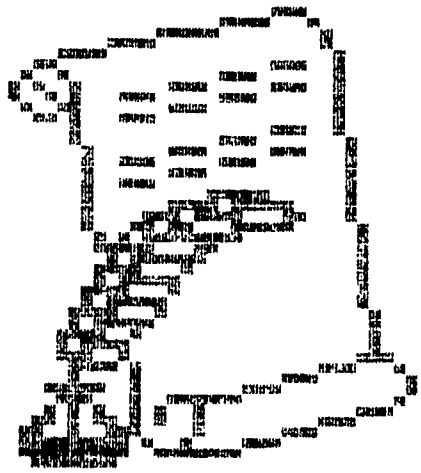
To explain these relationships, one could simply view peer recognition as a form of social reinforcement; those who achieved are recognized and those who are recognized continue to achieve. It is, however more important to keep in mind that these social acceptance indices reflect students' personal preferences and thus evolve from a process of identification and self selection. If classroom grouping

For the students who are isolated, the teacher has to nurture the sense of belonging and security that the peer group is not inclined to give them.

were to be based on such a process, the dynamics of the various subgroups would in itself motivate and promote learning. As stated by Spache (1963), the academic learning would " function as a tool for personal and social development rather than as a drill" (pg. 138).

In devising subgroups within the classroom teachers rely exclusively on achievement test scores. Although they may be reluctant to change that approach they should, at a minimum, provide special support to the students identified as isolates in their class. It is absolutely essential that the teacher maintains for these students the sense of belonging and security that the peer group is not inclined to give them. This kind of safety net should remain in place until they develop greater social maturity.

CHAPTER 5



HOMEWORK ANALYSIS & THINKING SKILLS

Students' progress toward mastery was continuously monitored through the weekly homework. In scoring these assignments, the Helping Hands team paid equal attention to the right answers as well as to the incorrect ones. Because this measurement of performance extended over an eight-month period, and concentrated every week on the same skills, significart patterns in the participants way of processing information and solving problems became perceptible. Some of these patterns were common to both reading and math; some were peculiar to only one of the subject matters. The following points have been the most often observed.

Reading

1. Students seem to be sensitive to only two types of items from the reading passage: those that require the retrieval of details from a paragraph, and those that are evaluative in nature. The dominant tendency is to look for a literal answer in the passage whether the question calls for stating the main idea, generalizing, or expliciting a grammatical expression. Students take as a cue a word from the question and then try to find the word sequence in which that cue appears; this becomes their answer. Such a strategy works to a certain extent because a significant proportion of the items in a standardized test, especially at the lower grade levels, involve the retrieval of passage details. The more inferential questions are missed because they may not even be perceived as such by the student. The first step, therefore, towards better reading comprehension may be to develop student awareness of the variety of questions that can be asked from a passage.

2. It is not that students fail entirely to apply inferential thinking, but when they do, they tend to generalize from their own knowledge base rather than from the available information. While that is understandable, it is nonetheless problematic for the task at hand. For instance, when asked about an author's or a character's point of view, the students tended to express their own. To illustrate, a reading assignment was given on the Christmas gift which a young boy received; to a question about the boy's feelings a great many students stated they themselves liked or disliked the gift. The standard of evaluation, therefore, was not the author's description, but the student's own experience. The tendency to be evaluative rather than analytical carries over to many other areas, especially the understanding of written forms. For example, in distinguishing between facts and opinions, students tend to consider as fact an opinion which they are in agreement with. This underlying "experiential" approach to reading makes it difficult for students to understand passages that are expository in nature. When passages of this type constituted the assignment, the number of students who left many items blank was greater that than for narrative passages.

3. One suspects that this literal/experiential strategy has become predominant in students' repertoire because they lack the necessary information base to develop the other comprehension subskills. The point can be quickly illustrated in the following way. A 6th grade reading passage included the following reference from a speech by Dr. Martin Luther King Jr:

"If it befalls your lot to be a street sweeper, set out to sweep streets like Michelangelo painted pictures; set out to sweep streets like Beethoven composed music; set out to sweep streets like Shakespeare wrote poetry."

Students were asked: What do Michelangelo, Beethoven, and Shakespeare have in common? The answer from a majority of the sixth graders was: "All three swept streets" (sic). It is obvious that what students responded to was the word sequence, not the meaning of the sentence. The probable reason is that they lack the background information that would have enabled them to see the connection between Michelangelo, Beethoven, and Shakespeare as intended by Dr. Martin Luther King Jr. Some might protest that such classical references are remote from sixth graders. However, even a comparison based on more current facts was not handled any more successfully. In another assignment students read about Olympic athletes such as Jesse Owens and Carl Lewis, but were unable to state what they had in common.

The important point, however, is not the youngster's actual lack of information, as it is their timidity in getting access to all kinds of information. Many students seemed to have been unaware that they could have gotten information or clarification on a point by consulting an encyclopedia, a dictionary, or simply an adult or a peer. A recurring item in the homework assignments asked students to find the definition of a word and then to write a sentence using that word. At the beginning of the school year, we observed that such items were often left blank. Students had to be prompted to use a dictionary to look up the unknown word when necessary. The inability to use information resources seemed so general that it led us to conduct a survey of the libraries not only at the schools participating in the Helping Hands project, but for the entire school district. The conclusion derived from that analysis is that, for better reading comprehension, students need greater

access to structured sources of information both semantic (books) and figural (television perhaps).

4. A final observation from the reading homework relates to student writing. Since students had to construct their answers to items, each reading assignment provided automatically a writing sample. Two problems became apparent. A) Students' processing of information is often incomplete as evidenced in their sentence structure. Many times the sentences are truncated, although a youngster may be convinced that he/she has written all the information. If students have difficulty processing to the end information which they possess, it becomes even more difficult for them to completely process information being conveyed by someone else. It would appear that students simply sample from the word sequence some outstanding elements. If (or when) that sampling is partial, comprehension becomes distorted. b) The second problem relates to word decoding as evidenced in students' spelling. Many students seem to follow some kind of phonetic or quasi-phonetic rule in spelling words. We noticed for instance:

ben for bent	fren for friends
ones for once	axcep for accept

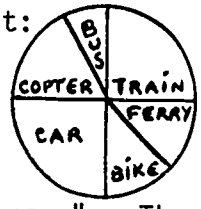
If the meaning of a word is known by a youngster, but its written form is not readily recognized, he/she will need more time to decode that word. As a result, comprehension speed, if not accuracy, will be hindered. On a standardized test this can result in lowering the child's test score.' Beyond the indirect impact of such a problem on reading, one can see that the task of the instructor who has to teach writing is fairly complicated. Indeed, the problem cannot be corrected unless the teacher understands the "logic" behind a particular graphic form used by a student in a short essay. The chances for even diagnosing the problem disappear if writing instruction is postponed

until the final high school years. Therefore in order for there to be an improvement in reading and writing, writing assignments, at least at the intermediate level, in elementary schools must be given.

Math

1. It was noted previously that when students are required to reason and evaluate information, they tend to operate from their prior knowledge base rather than from the data presented. This is true for both reading and math. Consider the following example included in a sixth grade assignment:

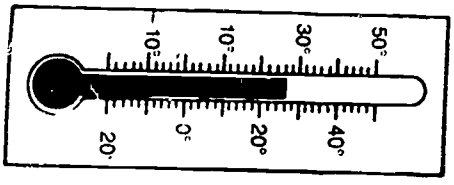
"The chart to the right shows the kinds of transportation people use to get to work. Name two kinds of transportation which are used equally by people?



The answer given by many students was: "bus and car." The "experiential" approach again predominates. It is not that the students did not think, but their reasoning did not consider the problem's definition.

2. Another factor affecting both reading comprehension and mathematics is the improper processing of words, particularly with word problems. It is not that students fail to totally understand the statement of a problem, but rather by misreading the statement they are led to a totally different solution. For instance, in one assignment students were given the following item.

"The temperature shown on the thermometer below is....."



Many students filled in 30 degrees as the answer instead of 25 (or 24) as is indicated because they read the problem stem as:

"The temperature shown on the thermometer is below ....."

Sometimes in spite of that kind of reinterpretation or misrepresentation, students can produce an answer that is correct in part or in whole, as in the following case:

Problem: "Round off the first number to the nearest hundred and the second number to the nearest thousand"

50,732 83,915

Answer: 50,732 - 50,700 - 51,000

83,915 - 83,900 - 84,000

In trying to understand this response pattern, we came to realize that students had interpreted the problem statement as:

"Round off the numbers first to the nearest hundred, and second to the nearest thousand"

While the outcome showed that these respondents understood the technique of rounding off, it was obvious that the thinking process leading to that outcome needed some correction.

In some areas of math, specifically measurement, the kind of inversion described above seems to be related to bilingualism/biculturalism. For instance, a recurring item at the fourth grade level required students to report the time from a traditional clock. With the small hand on 2 and the big hand on 9, many bilingual fourth graders indicated the time as 2:45 rather than 1:45. In conversation with them, it became clear that their answer was influenced by the Spanish formulation: "Quince para las dos." Through these various examples, one can trace the link between language competence and

mathematics. However, the more important point that needs to be retained is that a critical step in problem solving is the proper definition of the problem.

3. It is possible that many students do not attempt to understand a problem's definition or question, but instead operate from cues picked-up from grade to grade. For example, they may have learned in the second or third grade that the cue "How many" in a problem calls for an addition of numbers. This is carried over to the fourth grade and beyond. So, for example, to an item like the following:

> "Twelve people go to a restaurant to eat. No more than four people can sit at each table. How many tables are needed to sit everyone?"

the answer offered by some students was: 16 (i.e., 12 + 4) while others said 8 (i.e., 12 - 4, perhaps improperly recalling the subtraction cue "How many more").

4. Graph interpretation is a subskill that many students have difficulty mastering. Our observation has been that their tendency is to respond to the visual/pictorial information presented rather than the numerical/symbolic component of the graph. For example, an item showed a circle with two-thirds shaded. Students were asked to indicate which fraction of the circle was darkened. More than 30 percent of the respondents, perhaps interpreting the graph as background and figure, answered one-half, i.e., one part out of two. A relation was perceived, but not the pertinent one.

5. The various subskills involved in math applications are not seen as related. Often learned (if not taught) independently, they are not put to work together for problem solving. As a result, one observes some striking decalage from one math subskill to the other. Once students are made aware of the relationships, however, improvement tends to ensue. For example, it was noted that students had a greater rate of success with number sentences than with word problems, especially those requiring more than one step operation.

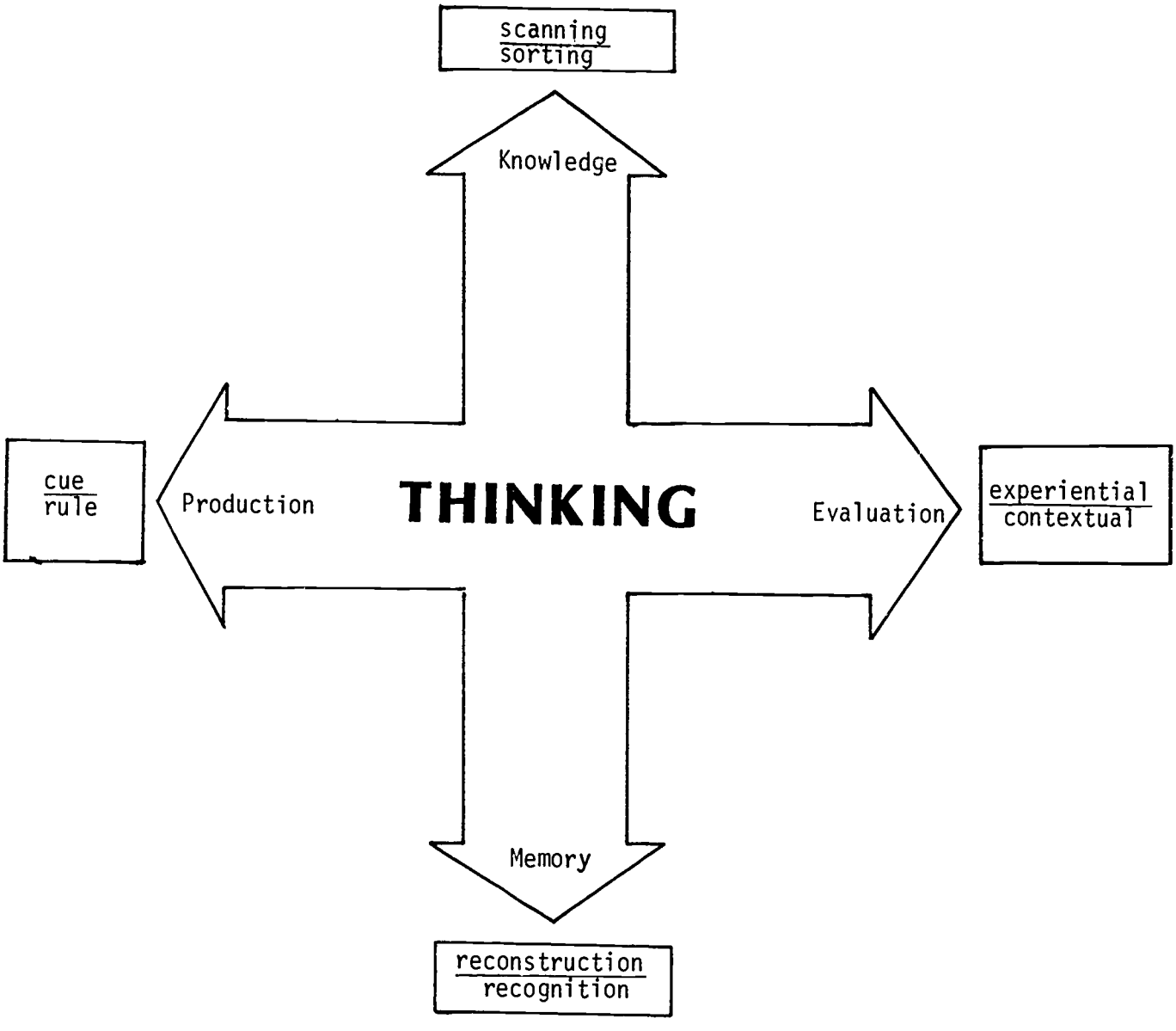
Students were then shown how each word problem could be written as a succession of number sentences. For four successive assignments, the item pertaining to that objective was given the following format:

> Carlos earns $3.50 each time he mows a lawn. On Saturday he mowed five lawns and on Sunday he mowed nine laws. How much money did he make for those two days?
>
> 5 + ____ = 14
>
> ____ x 14 = _____

Following this "training" period students who showed their calculations on the homework page were observed to be using the technique and successfully solving the problems.

From the various points discussed above, we draw the following inferences: It is inaccurate and superficial to state that students do not know how to think. Their thinking strategies simply lack the necessary flexibility to complete all the academic tasks on hand. However, one needs to be aware of their dominant strategies in order to complement them and bring about that intellectual flexibility. As we understood it, a) where knowledge skills are concerned, students tend to only scan for information without simultaneously sorting it into easily understandable categories; b) where memory is involved, students appear to reconstruct information from scattered elements rather than recalling it in readily usable chunks; c) where production (convergent thinking) is necessary, students seem to rely on the use of cues rather than rules to come up with solutions; d) where evaluation is called for, there is a degree of interference of students' own experience with the context of information.

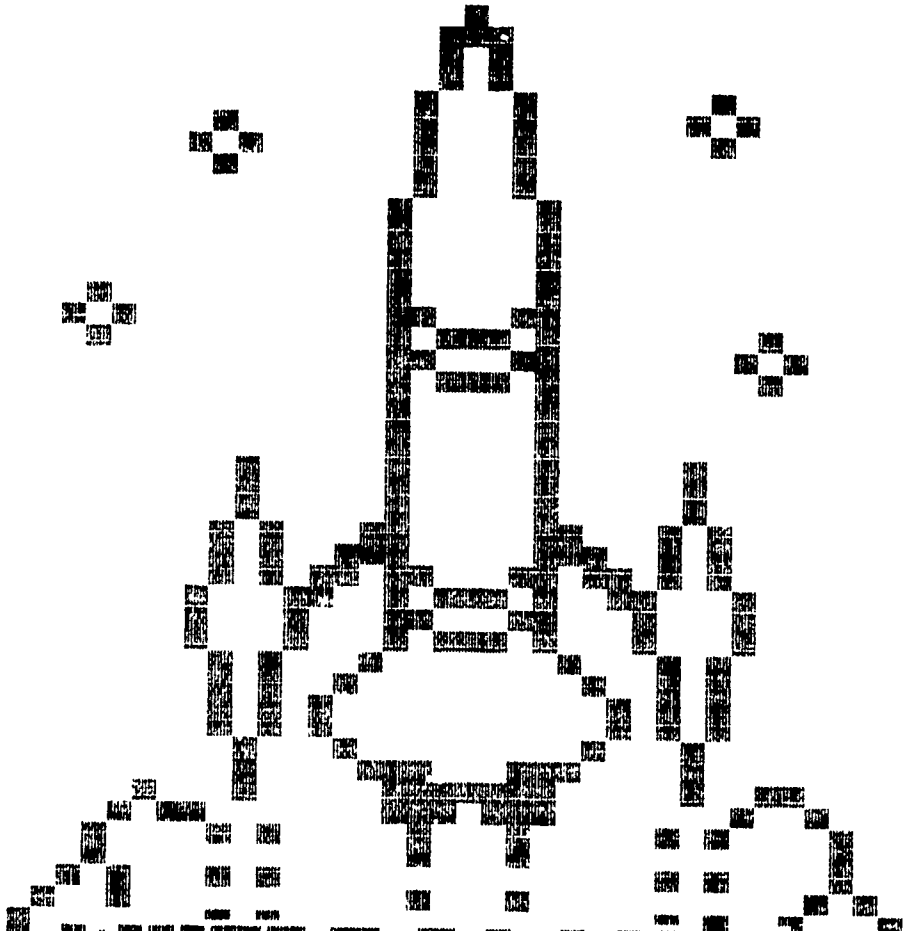
Figure 5 - Thinking in different directions



Predominant learning strategies used by our students, and their necessary complements.

The analysis of the data presented here is a continuing activity. With more than 2,300 work samples, we thought that the information base deserved treatment under a separate cover. A homework manual is in preparation that will include all the assignments, and expand the study of project participants' response patterns. Where applicable, statistical tests will be brought to bear on some of the observations or hypotheses advanced here. However, as presently formulated, we believe they are useful for understanding students' thinking strategies and learning difficulties.

CONCLUSION:



"WHERE DO WE GO FROM HERE?

The conclusion of this report briefly presents the major findings and addresses the following questions: What are the unique factors that made this project successful? How can the project be improved upon? How can the school district best use the findings? What is the general educational significance of the project?

I - What Have We Learned?

The project helped students meet and more often exceed both local norm and national norm expectations.

1) Due to their participation in the Helping Hands project, all students improved their competitiveness in math concepts/applications. For reading comprehension, success was partial with a significant increase at the fourth grade level, but only marginal improvement at the sixth grade level.

2) In terms of real proficiency, the degree of mastery was maintained, if not improved, for 67 percent of the subskills involved.

3) The following needs in problem solving and communication skills remain to be addressed.

   a) If students have difficulty with inferential questions, it is partly because they make use only of their own knowledge base rather than integrating the available information. Because of the predominance of this learning strategy, it is imporportant to help students expand their information base in order to develop the necessary skills for generalization, character analysis, and critical reading.

b) Writing skills are very deficient. Regular assignments on composition may yield incalculable dividends in both writing and reading comprehension.

To stimulate the more advanced subskills, we need greater diversity in the instructional strategies, the learning resources, and the assessment methods.

c) The various subskills involved in math applications are not understood as related concepts, but as separate entities. Thus, there is no real transfer of knowledge or skill interfacilitation. Given the strength of these students in basic arithmetic, there is no major obstacle to change from a cookbook approach to a problem solving approach in math instruction.

4) On the affective side, student interrelationships may hold the most pertinent information about student development, influencing attendance, mobility, and achievement. There is present no attempt to utilize that information for a better management of learning.

5) To meet the needs described above, one might give consideration to the following points among others:

a) Better libraries that will afford students continuing access to learning resources, and the chance to develop reference skills.

b) Development of a formative testing program that will facilitate instruction for mastery, and improve competitiveness especially if it is anchored to the end-of-year (summative) testing programs.

c) Training for teachers in acquiring or developing leadership skills for a better management of the learner.

d) Utilization of television as an educational resource.

e) Structuring a supportive peer network within each classroom.

II - Why was the Project Successful?

The following factors contributed to the successful implementation of the Helping Hands project and led to the positive outcomes:

The only way to get and maintain a teacher's interest is to provide timely and specific information that can advance each student's learning.

1) The treatment was multidimensional. Although reading comprehension and math problem solving were the targeted subject matters, several aspects of the classroom experience were touched upon simultaneously.

2) Feedback about individual student's progress was very specific and was provided on a short cycle. The specificity of the information led to increasing acceptance of the program by teachers. They could immediately use the information to alter the course of instruction.

3) The weekly homework gave the project a hands-on character, and insured the consistent involvement of every participating student.

4) The project rested upon a solid theoretical base charted out from Walberg's (1981, 1984) research on school productivity.

III - How Can We Make This Project Even More Successful?

There are three components of the Helping Hands project that, when expanded or modified, will increase its educational quality and its impact on student achievement. They are in order of importance: the relations between the home and the school, the use of alternative sources of information, the development of secondary skills supportive of reading comprehension, and math applications.

a) For this year parental involvement was not consistently sustained. The bi-weekly progress report did n ot work as a tool for parental monitoring. This was so partly because teachers were reluctant to engage in seemingly continuous evaluation of students, and partly because the majority of parents do not respond to such communications. Also, since students were the courier between the school and the home, it could not be determined whether the breakdown was occurring at their level. Two other approaches are now under consideration. One option is to replace the progress report by a monthly calendar of learning activities. Since a progress report always carries an evaluative connotation, the less successful students and their parents may not be eager to acknowledge it. A calendar of learning activties would indicate the topics that the teacher is about to cover. Such a proactive approach makes it possible for a willing member of the family (parent or sibling) to give the child advance exposure to particular topics. The more able students as well as the less able ones would benefit from such a preview. All evaluative connotations (with their aversive correlates) are removed. Instructional prevention may begin to balance instructional remediation. The other option is to have parents sign the weekly homework before it is collected. We observed that some parents were already doing so. Since the return rate on homework assignments exceeded 90 percent, parents who sign these papers may have a better chance to judge for themselves the needs and strengths of their children.

Parents cannot just be given periodic review of student progress or failure, they must also be given a preview of the learning tasks.

Only then may instructional prevention begin to balance instructional remediation.

b) The second channel used to broaden the learning experience beyond the classroom utilized the television as a source of structured information. Hitherto, this resource has not been tapped systematically. Based on our experience in the first year of the project, one modification seems necessary. Each week students should be encouraged, possibly requested, to choose any one of the recommended programs from

Judicious and creative use of TV offers a direct way to impact listening skills, comprehension skills, and writing skills at the same time.

TV guide and write a one-paragraph summary about it. This represents a direct way of impacting on listening, comprehension, and writing skills. We noted previously the improvement that is needed in students' writing skills. The urgency to address that need at the elementary school level is much greater now that some states (including New Jersey) have made proficiency in writing a requirement for high school graduation. The approach which is being considered here would free teachers who want to encourage writing from the weekly task of choosing a topic and providing an outline to these young writers. Since students are allowed to choose at least one from among four topics, individual preferences can be accommodated, and some flexibility in learning preserved. If, in addition, the task is periodically given as a group activity rather than an individual assignment, cooperative learning and social development can be promoted.

c) The other major area in which improvement is desirable is in the nurturing of secondary, but supportive cognitive skills. For reading skills development, the project dealt exclusively with six comprehension subskills. But, as indicated by the results, word knowledge is a significant factor in comprehension especially at the sixth grade level and for bilingual students. In the homework assignments, more items needs to be included to stimulate vocabulary development. One way of doing so may be to promote the use of referential materials such as dictionaries, encyclopedias, maps, etc. We have come also to recognize that stimulating reading achievement through homework is a direct, but limited approach. Reading itself must become a rewarding experience. Short of that, reading must be connected to some positive reinforcement. One possibility under consideration is to organize for each class some sort of "read-a-thon," involving the school librarian. Students would be given a recognition card for each book read, and at the end of the semester, all students who have read more than a predetermined number of books would be honored.

IV - How Best Can the School District Use These Findings?

Moving from the participating classrooms and/or schools to the district level, it is possible to distinguish three areas that could benefit from adopting the Helping Hands strategy in part, or in whole, the mainstreaming of bilingual students, the rescue of twice retained students, and the prevention of premature school withdrawal (dropout).

A- Mainstreaming

We have to be careful not to move the newly mainstreamed bilingual students into instructional limbo.

Although there is a well structured bilingual and ESL program in the district, when students are mainstreamed into the regular school program, they go through a period of instructional limbo. Having scored above the predetermined cutoff mark on the Language Assessment Battery (LAB), these students are considered proficient in English by the bilingual instructor. However, the regular classroom teacher finds their skills so marginal that he/she is at a loss to adapt instruction to their level. A program similar to the Helping Hands can be very instrumental in bridging that gap. First of all, with a homework series that focuses on the major subskills, and analyzes indepth each student's answer from week to week, greater understanding can be provided on the students' learning difficulties. Second, by

using the Friendship Test to trace out student interrelationships, it becomes possible to pair the newly mainstreamed student with one or more peers of his liking who might be bilingual and more proficient, thereby establishing an opportunity for peer tutoring. Thirdly, because the Helping Hands project provides for formative testing in mid-year, using the Metropolitan Achievement Survey (a standardized instrument in English), the result of that assessment can be the basis for a rational decision whether to test the mainstreamed students in Spanish or in English at the end of the school year.

B - Academic Retention

When a group of students have not adjusted to the dominant educational structure, it serves no purpose to simply quarantine them; we must get more infor-

Students who have been retained once or twice in consecutive grades are doubtlessly having difficulty adjusting to the dominant educational structure. The experience of repeated failure has likely affected their academic self-concept and dampened their motivation to learn. Rescuing these students require a multi-dimensional intervention that touches on several aspects of classroom learning at the same time. This is precisely what is offered through the Helping Hands project. First of all, by introducing into the initial assessment measures like the Raven

mation about their cognitive and metacognitive resources.

Matrices, which tap factors other than semantic competence, information is provided on students' cognitive resources. The use of the visual arts (through the e ducational TV guide) opens up a learning channel for students who may more easily process information in figural/ pictorial mode. Second, the structure of the homework assignments which continuously recycle the same instructional objectives under different forms, provide for overlearning, an opportunity which is rarely accommodated in the regular classroom. Third, the reliance on a progressive reinforcement system is intended to counterbalance the anxiety provoking methods usually applied to maintain discipline in the classroom. By making learning a little more rewarding, it may help restore student academic self-concept.

C - Dropout

It is understood that there are a number of social and economic factors that trigger early school withdrawal. When the dropout rate reaches 30 to 40 percent among high school students in urban districts, one cannot attribute the

If absenteeism and transiency can be regarded as early warning signs of disaffection with school, we now know that they have at their roots classroom isolation.

phenomenon only to individual characteristics. However, a number of dropout students seem to go through a period of disaffection with school, prior to their actual departure. Preventing that kind of disaffection is a task the school has to tackle. If absenteeism and transiency can be regarded as early warning signs of disaffection, we now know that they have at their roots classroom isolation (see Chapter 5). The Helping Hands feature which allows for the identification of student isolates, also provides the means to put together a supportive network for them. A second factor known to be related to disaffection and premature withdrawal from school is academic failure. The poorer a student's performance over the years, the greater the probability of his/her dropping out of school. In that regard, the dropout of tomorrow is often the retainees of today. Therefore, the strategies described above for rescuing the retainees are also pertinent for dropout prevention.

V - What is the General Educational Significance of this Project?

The guiding principle for the Helping Hands project was to create a degree of instructional intensity in the classroom, which would promote learning for

It is absolutely urgent to reduce the amount of discontinuity in the schooling experience of the urban child.

students of all ability levels. In implementing the project, however, we have begun to learn why it is difficult to generate and sustain instructional intensity or academic excellence. The lession is: there is too much discontinuity in the school experience of the average urban child. This discontinuity manifests itself in at least three forms:

a) There is discontinuity in the way students' cognitive needs, on one hand, and affective development on the other, are addressed (or ignored) in the school. Academic learning is by and large set up as a competitive activity which is not made to benefit from the interpersonal dynamics of the classroom.

b) There is discontinuity between the instructional process (daily lessons) and the evaluation process (standardized testing). The objectives covered during classroom instruction and assessed through homework are only loosely associated with those included in the achievement tests. Therefore, no real opportunity is provided for overlearning.

c) There is discontinuity between the two learning environments represented by the school and the home. Teachers sometimes complain that parents do not seem to care enough. The repartee from parents is that the school too often treats them like mushrooms, keeping them in the dark; they are never told what is to be done, they are often told what is wrong with their children.

These various forms of discontinuity keep the learning process in a state of atrophy. Children who as first graders performed at or even slightly above the national norm on standardized tests (in the Newark School District), find themselves falling further and further below that norm as they move up the grade ladder and discontinuity becomes more marked. So, by the fourth grade level, instead of an acceleration in the children's academic development, what one observes is a deceleration, instead of an accumulation of educational capital, one registers what economists would call a negative amortization. In other words, it is not that the students are not learning, they are just not learning enough to keep up with the competition. It is not that the teachers are not teaching, but instruction seems to be more and more off target. In response to this situation, the tendency is to devise more classifications of learning disability, or at best to create some new instructional program. However, unless the strategies (not just the goals but the very strategies) of this program are carefully aligned with classroom instruction, and accommodate socio-emotional development, there can only be greater fragmentation of the school experience, greater discontinuity.

Discontinuity keeps the learning process in a state of atrophy. Instead of an accumulation of educational capital, we obtain the equivalent of a negative amortization.

Cognitive and affective continuity can be achieved without detracting from academic pursuit

If the Helping Hands project has shown anything at all, it is that it is possible to create greater continuity in the educational fabric. This can be achieved without detracting in any way from academic pursuit. The classroom environment is only made more dynamic and, thus, more conducive to instructional intensity and learning.

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APPENDIX

Award Certificate
For
Superior Performance

Be it known that _____

has demonstrated exemplary proficiency in the month of

_____

and in testimony thereof is awarded this

Certificate

In Witness Whereof we affix our signatures on this

_____ day of _____ A.D.

_____ _____

Friendship Test

Directions: These five questions ask you to choose four students in this class with whom you would like to do certain things. In the spaces provided next to a, b, c, and d you are to write each student's first and last name.

Your Name_____

		FIRST NAME	LAST NAME
1. If you had a group project for your class to work on, which four students in this class would you like to be in your group?	a)	_____	_____
	b)	_____	_____
	c)	_____	_____
	d)	_____	_____
2. If you had to form a team to play a game of basketball, which four students in this class would you put on your team?	a)	_____	_____
	b)	_____	_____
	c)	_____	_____
	d)	_____	_____
3. If you had to form a study group to prepare for a test in reading, which four students would you like to study with?	a)	_____	_____
	b)	_____	_____
	c)	_____	_____
	d)	_____	_____
4. If you had four extra tickets to go and see a Michael Jackson concert, which four students in this class would you give those tickets to?	a)	_____	_____
	b)	_____	_____
	c)	_____	_____
	d)	_____	_____
5. If you needed help understanding how to do a problem in mathematics and you could ask any four students in this class for help, which four would you ask?	a)	_____	_____
	b)	_____	_____
	c)	_____	_____
	d	_____	_____

Bi-Weekly Progress Report

Student's Name_____ Period of_____ (Date)

Grade _____

RATING

PERFORMANCE OR BEHAVIOR	Exemplary	Good	Making Progress	Needs Improvement	Unsatis-factory
READING					
MATH					
WRITING					
STUDY SKILLS					
ATTENTIVENESS					
COOPERATIVENESS					
DISCIPLINE					
ATTENDANCE					

Teacher's Signature _____ Parent's Signature_____

Student's Signature_____

Student's Name_____ Date_____
4th Grade

1. Carlos, Kevin, and Joan are making a stamp collection for a class project. They need to bring 80 stamps in all. If Carlos brings 25 Puerto Rican stamps, Kevin brings 30 African stamps, and Joan brings 17 Haitian stamps, how many more stamps will they need?

   Step I _____ + _____ + _____ = 72

   Step II _____ - _____ =

2. Paul needs to buy 5 gifts for his friends. At Toys R Us, he sees a Knight Ridger car being sold for $1.00. He buys 5 cars, and gives the cashier a $10.00 bill. How much change did the cashier give Paul?

   Step I _____ x _____ = $5.00

   Step II _____ - _____ =

3. Maria's mother has three pots. The first holds a quart of water, the second holds a pint of water, and the third holds a gallon of water. Which pot holds the most water?

4. Ruth is counting by 4's, but after a while she makes a mistake. Here is part of her counting list. Circle her mistake.

   52 56 60 62 68

5. Round to the nearest hundred

   724 _____

   774 _____

6. What number goes in the box to make this number sentence true?

   4 + (5 + 3) = (7 +) + 1 =

7. Draw a figure of a pyramid.

Student's Name_____ Date_____

Grade 6

I recall one Christman day -- I was 8 or 9, I guess -- we received no gifts at all, just fruits. We only got fruits for Christmas! I didn't understand it; I cried. I told my mother and father it wasn't fair. I did not realize at the time that they had given me what they had. I could only think that it was not right. I wanted a racing car set for Christmas, and I thought that my Dad would have given it to me. Instead, I got only fruits. I could not stop crying -- maybe I was crying to get my way.

My father use to save silver dollars. I think that he had saved about 3 or 4 hundreds of those silver coins, and he kept them in a big glass jar in his bedroom. He looked at me. Then, without a word, he walked into the bedroom, opened the closet, and grabbed the jar. He took me to the store, and bought that racing car set which was about $90 or $100.

I played with it one day. One day! Then, I broke it and just forgot about it. Later on that week, my father came into the room. He saw a track here, a track there, a couple of wheels here, and the body over there. He simply said "You tore it up"? I opened my mouth to answer "Yeah, it's no good anymore." Then I saw the expression on his face. I can still see the hurt in his eyes. He had done something for the love of his son; yet it was not appreciated. He had given up those silver dollars which he could have used for something better, yet I did not understand that. Now he stood there with all that hurt in his eyes. And that look turned my young life around.

(adapted from an interview with
Sugar Ray Leonard)

1. Do you know another word that has the same meaning as recall? Write a sentence using that word.

2. What title would you give this story?

3. What is the lesson to be learned from this story?

4. What did this child want for Christmas?

5. How did the father feel when he saw the broken car set?

6. Select a sentence from this story that states an opinion. Copy that sentence in the space below.

Newark Library Survey

School:_____ (Fill out one form for each school where you work)

Student Enrollment:_____ Grades Served:_____

Librarian:_____ Days at School:_____

Survey Respondent:_____

1. Indicate the number of titles (hard-covered editions only) at your school as of March 31, 1985, in each of the following categories and overall total. Count serial volumes of one title (e. g., encyclopedia sets) as one title.

	Number of Titles
General Works	
Philosophy	
Religion	
Social Sciences	
Language	
Pure Science	
Technology	
The Arts	
Literature	
History	
Fiction	
Biography	
Total	

2. What percentage of the above titles are appropriate for students in your school in terms of:

	Percent
a. reading level	
b. interest level	
c. other _____ (please specify)	

3. Indicate the number of paperback books in your school library?

_____

4. Indicate the number of current periodical subscriptions in your school library?

_____

5. Where are the library books and other materials located in your school?

____ School library
____ Resource room shared with other programs (i. e., Remedial Reading, Chapter I, SCE, Bilingual/ESL)
____ Distributed among individual classrooms
____ Storage area, not readily accessible to faculty or students
____ Other _____
please describe

6. For each grade level, indicate how often classrooms have scheduled library periods at your school:

Grade

	1	2	3	4	5	6	7	8
Weekly								
Biweekly								
Monthly								
No periods regularly scheduled in library								
Not applicable no school library								
Other								

7. Indicate whether the library is accessible on a scheduled basis to:

____ Individual students
____ Small groups of students
____ Classrooms
____ Faculty
____ Not applicable/no school library
____ Other _____
please specify

8. Are students allowed to borrow books from the school library?

____ No
____ Yes
If yes, indicate average number of books checked out by a student per visit_____

9. Indicate the average weekly circulation of books at your school library?

_____

10. What difficulties, if any, has your school encountered in scheduling fixed library periods for individual classrooms?

_____

_____

_____

_____

11. How often do classroom teachers and the librarian typically communicate about library-related activities or materials?

____ 0-1 times/month
____ 2-3 times/month
____ 4-5 times/month
____ 6 or more times/month
____ No librarian assigned to school

12. Other comments:

_____

_____

_____