

T•A•I MATH

Team Accelerated Instruction

The idea of implementing a research-based and classroom-proven mathematics program is an appealing one to most educators. Several essential questions must be answered: What is the research base of the program and how was it developed? What are the effects on student mathematics achievement? What are the effects on student attitudes and behaviors? How many studies replicated the results?

The purpose of this report is to answer these questions as they relate to Team Accelerated Instruction, or TAI Math, one of the most thoroughly researched programs used in mathematics classrooms today.

RESEARCH BACKGROUND

Researchers at Johns Hopkins University's Center for Social Organization of Schools worked for over fifteen years to develop and evaluate cooperative learning instructional processes — processes which transform the traditional classroom in important ways. The researchers found that when students worked in small teams where success depended on the learning of all team members, students showed increased motivation and achievement, displayed increased self-esteem, and were more concerned with how classmates did. These experimental studies were conducted in regular classroom settings and used control groups of students learning by traditional methods for comparison.

In the 1980s, researchers from Johns Hopkins under the direction of Robert E. Slavin began working on mathematics instruction. All previous cooperative learning methods were generic processes that could be used with any curriculum. The Johns Hopkins researchers, however, felt that in a highly hierarchical subject area like mathematics, more variation in instructional delivery would be effective.

From the outset, the developers wanted to solve the theoretical and practical problems found in heterogeneous math classrooms. They aimed at accelerating math achievement in three ways:

1. minimizing the amount of time teachers spend with routine correcting and management
2. maximizing the amount of time teachers spend working with small groups and individuals
3. motivating students to put forth their best effort each day in math class

They also wanted to establish conditions that would foster positive attitudes toward all students, including mainstreamed and academically handicapped students as well as among students of different racial or ethnic backgrounds.

TAI Math was the result of this marriage of math curriculum and cooperative learning. TAI Math provided the following benefits:

- Team members showed increased motivation, achievement and increased self-esteem.
- TAI students showed a remarkable 2:1 ratio in achievement gains over control students.

T•A•I MATH: Teacher Tested – Classroom Proven

RESEARCH STRATEGIES

Five major studies were conducted to measure the impact of TAI Math. All of the studies used either random assignment of students or schools, or they matched experimental and control classes. The studies were conducted in urban, suburban, and rural public school districts and involved over 3,000 students in all. The duration of the studies ranged from 8 weeks to 24 weeks.

The research studies which document the effectiveness of TAI Math have been published in top academic journals. TAI also has been validated by the Department of Education's Joint Dissemination Review Panel (JDRP), which certifies the educational and statistical significance of innovative programs. JDRP certification means that TAI is eligible for dissemination through the National Diffusion Network (NDN) and is listed in its book, *Educational Programs That Work*.

TAI ACHIEVEMENT RESULTS

Five separate research studies document the impact of the TAI program on student mathematics achievement. In those studies, TAI students showed a remarkable 2 to 1 ratio in achievement gains over the control students. In fact, in the most recent study the ratio of TAI student gains to control students was 2.7 to 1.

The studies were conducted in urban, suburban and rural districts in Maryland and Delaware and ranged in duration from eight to twenty-four weeks. In each study the test used was the Comprehensive Test of Basic Skills (CTBS). A brief description of these studies and graphs showing the significant differences between TAI and control groups are provided in the shaded box to the right.

The research on TAI Math has thoroughly documented the impact that TAI Math has on academic achievement, as well as on math attitudes, self-esteem, social adjustment and classroom behavior. It is of special note that the findings have been consistent across urban, suburban and rural school districts — including:

- regular elementary and middle school classrooms
- classrooms with academically handicapped students
- special academic environments such as Chapter I and special education
- middle school and high school basic skills classes
- summer school programs.

TAI AFFECTIVE RESULTS

TAI research shows that when the mathematics classroom is structured cooperatively — where students can interact positively with each other, and can receive academic recognition regardless of past performances — many positive affective gains are made. Even in studies as short as eight weeks, TAI students demonstrated significant affective gains when compared to control students. The affect was measured in the following categories.

Math Attitudes

When asked to respond to statements on a questionnaire such as “I like my math class this year better than last year.” and “This math class is the best part of my school day.” students in TAI classes showed a significantly more positive attitude than students in control classes.

Self-Esteem

When asked to respond to statements such as “I’m a success in math” and “I’m proud of my work in mathematics,” students in TAI classes showed a significantly more positive attitude toward themselves than students in control classes.

Social Adjustment

When asked to choose friends in their mathematics class, students in TAI classes chose more friends, including more friends of another race than did students in control classes.

Classroom Behavior

Teachers in TAI and control classes were asked to rank the behavior of students in their classes using a behavior rating scale which contained four sub-scales. Students in the TAI classes were rated higher than control classes in classroom behavior, self-confidence, and friendships; they were rated lower than control classes in negative peer behavior.

Adjustment of Academically Handicapped Students

Academically handicapped students in TAI classes showed significantly better attitudes towards mathematics, greater self-esteem, more friendships, better classroom behavior and were rejected less often than their control counterparts.

STUDY 1 (Suburban)

Conducted in Howard County, Maryland with 286 students in twelve mathematics classes (grades 3–5) in four upper-middle class schools.

Grade equivalent gains in 8 weeks.

.44 TAI

.22 Control

STUDY 2 (Suburban)

Conducted in Baltimore County, Maryland with 303 students in sixteen mathematics classes (grades 4–6) in four lower and lower-middle class schools.

Grade equivalent gains in 10 weeks.

.28 TAI

.13 Control

STUDY 3 (Suburban)

Conducted in Howard County, Maryland with 1,371 students in fifty-nine mathematics classes (grades 3–5) in eight middle to upper-middle class schools.

Grade equivalent gains in 24 weeks.

1.37 TAI

.95 Control

STUDY 4 (Rural)

Conducted in Washington County, Maryland with 480 students in twenty-two mathematics classes (grades 3–5) in ten lower to middle class schools.

Grade equivalent gains in 16 weeks.

1.67 TAI

.78 Control

STUDY 5 (Urban)

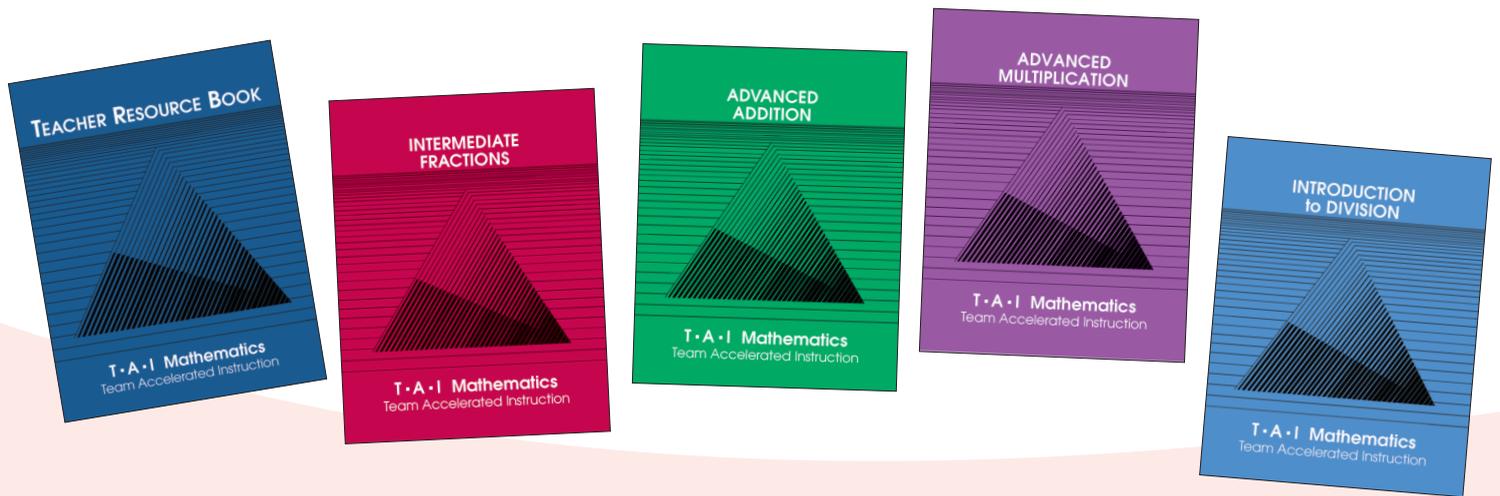
Conducted in inner-city Wilmington, Delaware with 353 students in sixteen mathematics classes (grades 4–6) in five lower to middle class schools.

Grade equivalent gains in 18 weeks.

1.65 TAI

.61 Control

"In 18 weeks, TAI students gained 1.63 grade equivalents, while control students gained only 0.61 — that's a ratio of 2.7 to 1..."



With TAI we could see right away that we had something very effective. The students just ate up the material. . .

You could see kids taking a great deal of responsibility, working together effectively and with a sense of purpose."

Robert E. Slavin Principal Research Scientist,
Johns Hopkins University Center for Research on K-8 Schools

**FOR MORE INFORMATION
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