

MATCH TUTORS: THE RESEARCH BASIS FOR THE EFFECTIVENESS OF TUTORING
IN PUBLIC EDUCATION

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Abstract

This summary highlights the considerable research done on effective tutoring programs and practices. Most studies have found that tutoring has had a major impact on the academic achievement of students. Research indicates that small group tutoring sessions (1:1) are better than large group tutoring sessions, tutoring is more effective in math, and that tutors of all ages can be effective. Researchers also found that programs with professionally trained tutors whose work is connected to the classroom see the largest academic gains. Integrating tutoring programs in schools across the United States could dramatically improve the academic performance of elementary, middle and high school students and help reduce the nation's dropout crisis.

INTRODUCTION

There is a great deal of evidence, consistent over decades, showing that too many students across the United States are not performing well. Every year 1.2 million students drop out of high school (Alliance for Excellent Education, 2007). This extraordinary drop-out rate forces us to ask the following question: What causes students to quit school? Although there could be many variables associated with school-dropouts, John Hopkins found that students who are most at risk of dropping out of school can be identified as early as sixth grade from key indicators: poor attendance, unsatisfactory behavior and course failure in math and English (Abele et al, 2009). When just one of these off track indicators is exhibited by a student, they have less than a 25% chance of graduating from high school.

Unfortunately, students who are not developing fundamental academic skills are not only at risk of dropping out, but are likely to end up on government assistance, stay unemployed, and struggle with incarceration. According to the Alliance for Excellent Education (2007), “The more than 12 million students projected to drop out over the next decade will cost the nation \$3 trillion in the coming decade.” Clearly, there are not only moral, but economic incentives involved in providing all students with quality education.

Because the nation must resolve the education crisis, the U.S. has been investing in many initiatives to help turn around chronically failing schools. Amongst these different interventions, evidence indicates that differentiated instruction, or personalized instruction, is an effective strategy for assisting students to make academic gains.

UNDER WHAT CIRCUMSTANCES DOES TUTORING WORK?

“Tutoring” can mean many things, and the effectiveness of tutoring varies with ratio, dosage and training of the tutors, as well as the school site’s adherence to clear rules, expectations and measures for success. Although both structured and unstructured tutoring can produce positive effects, the effects of structured programs are stronger (Cohen, et al. 1982). The U.S. Department of Education (2001) identified important characteristics of structured programs in a background research study, and found that tutoring works best if:

1. There are trained people under careful supervision.
2. There is careful monitoring and reinforcement of tutee progress.
3. There are frequent and regular tutoring sessions, with each session between 10-60 minutes daily (regular tutoring sessions generate the most consistent positive gains).
4. Tutoring sessions are well-structured and content and delivery of instruction is carefully scripted (The term “strategies” is a more fitting term for “scripts.” The general idea is that effective tutors must know their material and have instructional routines).
5. There is close coordination with the classroom or teacher
6. There is intensive and ongoing training for tutors.

Edward Gordon, international expert on individualized instruction, who has written the landmark book on the subject, *The Tutoring Revolution*, found that effective tutors not only must know the academic material, but also connect with their tutee and build a respectful relationship (Gordon, 2007).

Research has indicated other important aspects of effective tutoring. Reisner, et al. (1989) found that strong tutoring programs include defined time commitments from tutors and mentors

and a systemic screening of prospective tutors and mentors. Gaustad (1993) found that effective programs also have procedures for selecting and matching tutors with tutees and specific measurable objectives to assess individual progress and program success.

The University of Illinois (2009) also overviewed research on tutoring and found that the best performing tutoring programs have the following qualities:

1. Training tutors, especially novice tutors, on effective instructional strategies is critical to providing an effective tutoring program.
2. A diagnostic/ developmental template should be used to organize the tutoring program for each student.
3. Formal and informal assessment needs to occur for each student to guide the tutoring process
4. Tutors should track the progress of students in order to adjust their content, and strategies to improve tutoring sessions
5. Tutors should closely collaborate with the students' classroom teacher to maximize tutoring effectiveness
6. Tutoring programs should be structured around principles of learning and follow a sequentially arranged, systematic approach

Strong programs have incorporated the above elements in one way or another: structure, frequent contact with teachers, monitoring and evaluation. They carefully select tutors who have both the knowledge necessary and the interpersonal skills to build a good relationship with students, and train tutors with explicit strategies.

EVALUATION OF RESEARCH

In the next section, we highlight scientific literature that reviewed the impact of tutoring. We do not provide an in-depth evaluation of each study, but report on relevant findings.

Study I: Elementary Math Tutoring

Fuchs, et al. (2008) researched the effects of small group tutoring with and without conventional classroom instruction on at-risk students' math problem solving. A total of 2,023 third grade students participated in this four year study. A total of 119 third grade classrooms were randomly distributed into two classroom categories. Forty classes were selected to be in the control group. The students in the control group received 13 weeks of teacher-led math instruction (curriculum created by the teachers). The remaining 80 classes received Schema-Broadening Instruction (SBI), a specialized form of math instruction. SBI focuses on teaching students mathematical concepts by helping them recognize connections between problems like those worked during instruction and problems with unexpected features (i.e. problems that include irrelevant information, or present a novel question requiring an extra step, or that include relevant information presented in charts or graphs, or that combine problem types). In an initial three week period, both class types received a standard form of math instruction which was created by researchers. After this three week period, researchers identified the academically at-risk students through testing. The at-risk students were then randomly assigned to both classroom conditions, and within each condition the at-risk students were randomly assigned to SBI tutoring. As a result, they could compare at-risk students with one, two or no tiers of SBI.

The average age of the tutors was 23, each tutor received 2-4 students, and each session lasted 20-30 minutes.

They concluded that tutoring, not conventional instruction or SBI instruction reduced the prevalence of math difficulty and led to significant academic gains. Although researchers found that tutored students who received SBI classroom instruction outperformed tutored students who received conventional instruction, at-risk students who were tutored and received conventional classroom instruction outperformed untutored at-risk students in both classroom conditions. They also found that the advantage of tutoring over no tutoring was similar whether or not students received conventional classroom instruction or SBI instruction.

Study II: Elementary Tutoring

The Institute of Government and Public Affairs at the University of Illinois (2009) conducted research on studies of tutoring and found that one-on-one instruction is an “effective avenue for increasing student achievement, especially for students at risk for academic failure.” Each of the six studies reviewed found that tutoring effectively improved the academic performance of the students. Within their report, they highlighted a study conducted by Morris & Perney (1990) of an afterschool program that tutored low-achieving second and third grade students. Each student received one-on-one tutoring for one hour twice a week by university students, retirees, and volunteers. At the end of the year, every student experienced gains in reading. Half of the tutored students made a full year’s gain in reading while only 20% of the comparison group children did. Furthermore, 23% of the tutored students made more than a full years gain while the remaining students made limited progress.

Study IV: Elementary Math Tutoring

Fuchs et al. (2009) assessed the effectiveness of a remedial math tutoring program for 133 3rd graders in Houston and Nashville. The study focused on whether the success of math tutoring was different for students with math difficulty (MD) or students with math and reading difficulties (MDRD). Student with a math disability tend to manifest issues that are different than students who have both a math and reading disability. According to Fuchs et al., students with MD have issues with counting and solving combinations problems are already set up for solution. On the other hand student, with MDRD have difficulty using text to identify missing information and constructing a problem for calculation.

The students were broken up into three groups (Control, MD, and MDRD) and tutored by full time and part time adult volunteers. Each student was tutored three times a week for 16 weeks for 20-30 min. Each tutor received intensive training, regular corrective feedback and met with a supervisor every 2-3 weeks to talk about session issues. Tutoring occurred during the regular day, in the quietest location (i.e. the library) and was layered on top of classroom instruction. Students were not pulled out of their regular math class.

Researchers found that and that tutoring was effective in every condition, and that the type of math difficulty did not matter. The results showed that tutoring increased procedural computation, fluency and word problem skills. Furthermore, both MD and the MDRD groups outperformed the control group, stating that both tutoring conditions “effected superior outcomes compared to the control group.”

Study V: Meta-analysis of Tutoring

In their landmark book, *The Tutoring Revolution*, Gordon, et al. (2007) not only considers tutoring as an integral component to education reform, but found that tutoring effectively addresses the individual learning aspects of human thinking:

A child's education is a highly personalized process and is guided through the assistance of literate teachers. At their best, tutors remained the best equipped to assess individual differences among their students and engineer stimulating learning environments (97).

Gordon, et al. (2007) also reviewed scientific literature on tutoring and found the following:

1. Tutoring is reported to be more effective with disabled students who are maintained in regular classrooms compared to those assigned to special education classes
2. Early tutoring is useful for students having reading difficulties
3. Positive findings related to combining tutoring with methods of direct instruction
4. Tutoring interventions are more effective in math compared to reading
5. Some evidence indicates that if tutors are carefully supervised and instructional decisions are actually made by knowledgeable professional teachers, tutor training and or teaching experience may not be necessary for effective tutoring gains
6. Tutoring has positive social effects on both tutors and tutees
7. Tutoring has diagnostic value related to identifying poor readers with a cognitive limitation

8. A review by the Authors of Contemporary Research related to tutoring revealed more than 300 books and 7,000 articles that have indicated the benefits of tutoring.

Gordon found that most research indicates that tutoring is more effective in math than in reading. Many articles we reviewed reported greater gains in math than in literacy (Madden & Slavin, 1989; Cohen et al, 2007; U.S. Department of Education, 2011). Heinrich and his colleagues (2011) also found this trend in their analysis of supplemental services:

We find effects on both math and reading achievement for elementary students who receive at least 40 hours of SES, but only effects on gains in math for middle school students. Springer et al. (2009) and Zimmer et al. (2006) likewise found more consistent, positive effects of SES on students' math (vs. reading) gains in their studies of SES in large, urban school districts.

Robinson et al. (2005) reviewed scientific literature on peer and cross aged tutoring and found that tutoring programs in mathematics have strong academic outcomes for African Americans:

Peer and cross aged tutoring are worth strong consideration as mechanisms for improving mathematics achievement among minority students as well as for potentially improving attitudinal and socio-emotional outcomes.

This does not mean that literacy tutoring is ineffective, but that there is some aspect of math that is particularly easier for students to digest, or more likely, for tutors to deliver effectively.

Study VI: Elementary Math Tutoring

Topping, et al. (2010) conducted a two year randomized controlled trial of mathematics tutoring in 86 primary schools in Scotland. One of the purposes of the experiment was to compare cross-aged tutors to same-age tutors. Tutoring is considered “cross-aged” when the tutors are at least one year older than the tutees. This experiment involved 7-8 year old and 10-11 year old students of mixed socio-economic status. These students worked with one another three times a week. The average duration of each tutoring session was 30 minutes.

In this study, the researchers found that math tutoring was significantly effective in raising mathematics attainment only in the cross-aged group. Less able students made significantly greater gains than any other group in the study. From a macro-evaluation, they found that math tutoring was worth implementing in all schools.

Although the tutors are young in this experiment, the results support a general principal that tutoring is an effective strategy for accelerating academic growth. These students lack professional expertise, and did not receive in-depth training, yet were able to produce results, by tutoring up to three times a week for 25-30 minutes. The purpose of this is not to argue that training of tutors is not necessary, but that individualized attention regardless of the actual teaching caliber of the tutor can lead to positive gains. It is clear that the majority of educational literature emphasizes the importance of having well trained tutors, and that instances where adult tutors received adequate training tended to see significant learning gains (Elbaum, et al. 2000).

Study VII: Middle School Tutoring

Bender, et al. (1994) found that tutoring services can improve achievement among disadvantaged, mildly disabled, and limited-English-proficient students. This three year research project evaluated programs in Pottstown, Virginia, that provided individual assistance for “at

risk” students. Students were classified as “at risk” if they had received a “D” or an “F,” were one year below grade level, and were in Title I Programs before entering middle school. Tutors for the program were drawn from an undergraduate college, and a pharmaceutical company. Some tutors were high school students who were previously tutees in the project.

During the first year of the program, tutors were matched up with 4-5 tutees at a time. However the tutors felt that they were more effective with a smaller number of children. As a result the student tutor ratio was reduced to 1:1 and 1:2. Each week tutors were assigned to the same students. Each session during the week lasted an hour and a half, but sessions on Saturdays lasted two and a half hours.

The findings of the Bender et al. are echoed in a more recent U.S. Department of Education study. Bender et al. found that the grades of each student correlated with their level of participation. In the study, there were four levels of participation (Control, Low, Moderate, and High). Both control group and the “low” attending students experienced a significant decrease in grades over the academic year. Students who participated at a “moderate” level (attended 8-15 sessions throughout the year) remained stable over the year. Students who attended the program on a regular basis (at least once per week) demonstrated the greatest increase in grades every year. Similarly, during periods of non-participation the U.S. Department of Education (2011) found that students did not consistently make significant gains. Both of these studies point out that regular tutoring sessions and participation leads to improved academic performance.

Although research to date does not tell us what the optimal dosage of tutoring ought to be, this finding suggests 40 hours is not an adequate. In a preliminary research article on the effectiveness of SES tutoring programs, Heinrich et al. (2011) found that “below 40 hours of

tutoring, we do not identify any statistically significant effects of SES on students' math and reading gains (as measured by changes in test scores).”

Again, the amount of time necessary to see significant gains is unclear; but there is some evidence that indicates that schools should push towards providing interventions that have longer sessions.

Study III: Elementary and Middle School Tutoring

Madden & Slavin (1989) reviewed 40 studies on supplementary and remedial programs. One of the studies found that elementary and middle school tutees, tutored by trained adult volunteers outperformed the randomly assigned untutored control group. In this study, the tutors volunteered for 2-4 hours, tutoring each student for a half an hour, four days a week (minimum).

Madden & Slavin concluded that effective preventative remedial programs are “intensive, using one-to-one tutoring.” The study noted:

The most widely used supplementary/remedial programs, diagnose prescriptive pullout programs provided under Chapter 1 or special education funding, show little evidence of effectiveness. Programs that do show convincing evidence of effectiveness fall into two major categories remedial tutoring programs and computer assisted instruction. As with 1st grade prevention programs, the most effective supplementary remedial models involve one-to-one tutoring (10).

Madden & Slavin also concluded that tutoring is an effective strategy for preventing learning deficits in at risk students in elementary school.

Study VIII: Meta-analysis of Elementary and Secondary Tutoring Studies

In a meta-analysis study by Cohen, et al. (1982), researchers found that tutoring programs have substantial positive effects on the academic performance and attitudes of students in elementary and secondary school. A meta-analysis is a statistical analysis of a large collection of individual studies. Cohen, et al. (1989) used 65 studies in their analysis. In order to avoid methodological flaws, they filtered through over 500 studies using strict guidelines. For instance, each was required to have a non-tutored control group, and report on the quantitatively measured outcomes of each test group.

In this study, a total of 52 of the 65 studies reported results on the examination performance of students. In 45 of the 52 studies, the examination performance of the students who were tutored was greater than the examination performance of students who only received classroom instruction. According to researchers of this study, the average child of the tutoring group scored at the 66th percentile of the students in the untutored group.

A total of 20 of the 52 studies that reported on examination performance also compared classroom teaching to tutoring. In this comparison, they found that 19 of these 20 studies favored tutoring over conventional instruction alone. Results of this caliber increase the likelihood that tutoring is an effective choice to complement classroom instruction for at-risk students.

Furthermore, in this meta-analysis, eight studies reported information on the social aspects of tutoring. In all eight of these studies, the student attitudes toward the subject being taught were more positive in classrooms with tutoring programs.

Study IX: Elementary Reading Tutoring

The U.S Department of Education (2001) conducted research on the effectiveness of tutoring and found that trained volunteers or college students were highly effective.

In this paper, the U.S. Department of Education highlighted 20 studies, most notably a British tutoring program involving 2,372 elementary and junior high students. These students received one-on-one from parents and peers for 8.6 weeks. The students in the program improved their reading comprehension 4.4 times the normal rate and word recognition 3.3 times the normal rate. Extraordinarily, four months after the end of tutoring, the average tutee was still improving at twice the normal rate in both comprehension and word recognition.

Tutoring programs that are structured and have trained volunteers demonstrate higher achievement gains (U.S. Department of Education, 2001). However, Gordon, et al (2007) found that it is not necessary for tutors to be knowledgeable professional teachers, or have teaching experience to have an impact. In fact, some evidence indicates that if tutors are carefully supervised and instructional decisions are actually made by knowledgeable professional teachers, tutor training and or teaching experience may not be necessary (Gordon, et al, 2007). Nevertheless, the majority of research reinforces that training and structure are key elements of successful programs. Tutoring programs associated with the most positive gains provide extensive training for tutors, have formal time commitments by tutors and have structured tutoring sessions (U.S. Department of Education, 2001).

Study X: Meta-Analysis Elementary Reading

Elbaum et al. (2000) conducted a meta-analysis of 29 studies on one-on-one, small group tutoring. They wanted to investigate whether one-on-one instruction is more effective than small

group instruction for at risk elementary school students. Their study revealed that college students and trained, reliable community volunteers were able to provide significant help to struggling readers. Tutees tutored by college students made the greatest gains than any other one-on-one tutoring group— more than community members, paraprofessionals, and teachers. They “recommend that schools give serious consideration” to one-on-one interventions by college students and that using college students may reduce the cost of providing effective supplemental instruction.

CONCLUSION

Teachers are seldom able to provide individualized instruction, and often times are forced make a standard curriculum available to a group of students who are on a wide spectrum of skill levels. Having the addition of one-on-one or very small group (1:2) support is an extremely advantageous tier of support for students. We no longer have to assume that tutoring works, as its success is backed up by decades of research, which have established that well-planned tutoring programs can improve individual student achievement, self-esteem as well as overall school climate (Gaustad, 1993). From these research findings, we can conclude that tutoring should play a significant role in the country’s initiative towards improving learning for at-risk students.

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