

THE EFFECT OF THE DAVIS LEARNING STRATEGIES ON FIRST GRADE WORD RECOGNITION AND SUBSEQUENT SPECIAL EDUCATION REFERRALS

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The purpose of this study was to determine the beneficial effects of integrating various Davis Learning Strategies, primarily Davis Symbol Mastery, on sight word skills. The participants were 86 primary students from two San Francisco Bay area schools enrolled in the standard K-1 program. The dependent measures were the percentage of children who are able to meet sight word recognition on a list of 100 basic core words. For the first grade students the outcomes indicated that children scored significantly higher than the control group for the mastery of 100 basic sight words. In addition, follow-up data indicated that no special education referrals had been made two years after initial Davis intervention for any of the three pilot classrooms. However, gifted referrals from these same classrooms were higher than the typical school population. Discussion includes the effect of early reading success on future school and social performance. Suggestions are given for further assessment of the Davis method and ways to coordinate the Davis method with other support services in future research.

School Evaluation of the Davis Learning Strategies

Regardless of the philosophical orientation, educators seem to agree that literacy is one of the most important skills a student can apply to functional living in our society (Slavin, 1996; Weaver, 1990). Research in reading

indicated that children who read well have a very high probability of achieving success in school (Slavin, 1989, 1991, 1996; Slavin, Madden, Dolan, Wasik, Ross, & Smith, 1994). It has been suggested that there are at least 10 million children that need explicit instruction on sounds, word recogni-

tion and reading comprehension. (Lyon, 1997). If these reading skills are not acquired and mastered, children have an increased chance of later dropping out of school as well as being incapable of performing successfully in today's society (Hansen & Eaton, 1978; Howard, McLaughlin & Vacha, 1996; McLaughlin & Vacha, 1992a, 1992b; Vacha & McLaughlin, 1992, 1993). Unfortunately, there is a great deal of disagreement regarding how to increase the likelihood that all students will leave our current educational system fluent in their ability to read (Kammenui, 1998).

The United States Congress became involved with reading issues in the early 1990s because they viewed difficulties in reading as a serious societal problem. People who don't read well don't succeed in our society, as evidenced by the high percentage of criminals who are illiterate. The outcomes revealed: 1) Seventeen percent of children have difficulty learning to read and that this difficulty is unrelated to intelligence and socioeconomic levels. 2) Girls are just as likely to experience reading difficulties as boys, and 3) Reading difficulties are persistent and enduring. They are not 'developmental lags' that the child will simply out grow. Children who are lagging behind their peers in reading yet doing well in other areas rarely catch up. Children who are behind at the end of third grade only have between a 1:5 to a 1:8 chance of catching up (Becker, Hall & Moats, 1999; Becker 1977). Some researchers have viewed literacy as a way to avoid many of societal and educational difficulties found in large numbers of at-risk children and youth (Greenwood, Delquadri, & Hall, 1989) and an impor-

tant prerequisite for a successful life as an adult (Darby, 1996; Livingstone, 1998).

Research also concludes that early intervention and assistance is critical in minimizing the reading problem in the child's life. Children can be screened by mid-kindergarten to identify those most "at risk" for developing reading difficulties. Systematic instruction can be provided to reduce or prevent those children from ever falling behind or ever being referred for special education services. This approach requires the teacher to plan and structure learning experiences in a very sequential manner, first examining the skills and behaviors that the child needs, and then teaching those skills as early as possible (Lerner, 2000).

Failure to recognize and address academic concerns during the first three grades of elementary school greatly increases the odds that they will never catch up. This comes at a cost of not only emotional suffering, but also added financial cost to school district services (Schweinhart, Barnes, & Weikart, 1993; U.S. Department of Education, 1993). According to the National Institute of Child Health and Human Development, it takes four times as much assistance to improve a child's reading skills if help is offered in fourth grade versus starting the help in mid-kindergarten. This approach is called the "wait and fail" method because the child must fail before he or she is eligible for identification and services; a costly procedure (Lerner, 2000). Further, many adolescents who have received learning disabilities services at the elementary level continue to need help when they reach junior

and senior high school (Lerner, 2000).

Of these, almost one out of three youths with learning disabilities fails regular high school courses, and most experience failure before reaching high school (Blackorby, Edgar & Kortering, 1991; Wagner, 1997). Information available from the Department of Education shows dropout rates a fifth or more greater than those in special education than for students in regular education. Among those labeled as learning disabled, the dropout rate of those at the age of sixteen was 47% (Tenth Annual Report, 1988, Table; Kerner-Lipsky & Gartner, 1992). For example, in 1998, a Department of Education report showed that students over fourteen who have learning disabilities exited special education for the following reasons: 13 percent returned to regular education, 32 percent graduated with a certificate of completion, 33 percent moved, 18 percent dropped out of school, and less than 1 percent reached the maximum age of 22 or died (U.S. Department of Education, 1998). Early intervention could have averted the occurrence of secondary problems that compound the original difficulty (Lerner, Lowenthal, & Egan, 1998; Fletcher & Foorman, 1994; Bailey & Wolery, 1992). In Ontario, Canada academic records obtained from 193 students from two public elementary schools, showed that the students who experienced the most difficulty in mastering the two main areas of the 1st grade curriculum (reading and arithmetic) had a much higher probability of leaving high school without graduating than those who received B to A+ marks in 1st grade (Simner & Barnes, 1991).

A school-wide early intervention,

Neverstreaming (Slavin et al., 1991) has significantly reduced numbers of students who need expensive, long-term special education services. This prevention program allows students to be served based on need, rather than a special education label. Intervention and collaboration between general education and special education enables students the support they need to succeed. Slavin noted that neverstreaming, not mainstreaming or special education, should be the goal for all children who are at risk for school failure.

If the goal is to ensure that students never become remedial readers, then a shift from the traditional method of instruction to a more systematic approach, where mastery of skills is required, needs to occur. In the traditional model, students are taught in a group setting where all students are expected to learn the same material at the same rate with little variation in the mode of instruction.

Brandt (1990) states that, continuing to use the traditional methods, with 85 to 90 percent teacher talk, does not work for most students. Thus, if lecturing is one of the least effective instructional approaches, then educators need to reevaluate their role as "teacher". Are they experts or facilitators of learning? Do they recognize different learning styles, particularly the more visual, tactile-kinesthetic learner and are students given the time necessary to master objectives?

The concept of mastery learning, which presumes that students must learn each of a sequence of skills in order to learn a task, requires a shift in beliefs about ways to deliver instruction (Bloom, 1968). Mastery learning means essentially that if the proper con-

ditions can be provided, perhaps 90 to 95 percent of the students can actually master most objectives to the degree now only reached by 'good students' (Gagne, Briggs, & Wager, 1988). Individual instruction and closely monitoring student progress are key components of this approach. This requires more individual and small group instruction in which mastery holds constant and time varies (Robinson, 1992). These settings allow for greater active participation by students and, because they are more engaged and on task, the amount of learning increases. Teachers can easily assess whether students have acquired the skills and subskills necessary for the next level of instruction. Also, active learners (1) attend to instruction, (2) attribute results to their own efforts, (3) relate tasks and materials to their knowledge and experience, and (4) actively construct meaning during learning. Instruction for active learning capitalizes on the child's interests, stresses the importance of building background knowledge prior to teaching, and encourages the active involvement of students (Lerner, 2000).

If students are to be truly successful, educators must also be aware that people possess multiple intelligences, at least eight different types of intelligence (Gardner, 1993; Gantreut; Hatch, 1989). Much of school learning calls upon linguistic intelligence or verbal conceptualization. This will certainly yield disastrous results for those who do not think in this manner. These individuals may have a deep reservoir of creativity and intellectual power and unusual strengths in originality, insight, knowledge, humor, and emotions (Coben & Vaughn, 1994; Hearne &

Stone, 1995; Vail, 1990; Waldron & Sapphire, 1990). Lerner (2000) felt that teachers can meet the unique needs of students whose strengths and talents lie outside the narrow view of knowledge as being purely linguistic by first helping students bypass their deficits as they access their areas of strengths. Second, by modifying assignments and curricula for these students so their true abilities can be demonstrated, and thirdly, by creating an environment that nurtures personal creativity and intellectual characteristics.

The purpose of the present research was to determine the beneficial effects integrating Davis Learning Strategies into standard K-1 curriculums might have on sight word recognition.

Method

Participants and Setting

The participants of this study were 86 elementary students from two San Francisco Bay area elementary schools. Three classrooms participated as pilot classrooms representing one school district. Forty-eight first grade students involved were instructed in the Davis Learning Strategies with another 48 first grade students in the three control groups. Based on free and reduced lunch counts, one of the pilot and control groups represented a higher socio-economic setting while two of the classrooms represented a lower socio-economic settings.

Materials

Various Davis Learning Strategies were used in this study (Davis, 1994). A detailed description of the procedures can be found in Davis (1994). This program is a visual, kinesthetic,

cognitive system for teaching basic skills. Included are focusing skills, Symbol Mastery activities for letters, punctuation, words, and concepts, as well as reading exercises. A four-day workshop was required to prepare the teachers for implementing the Davis Learning Strategies. A mentor from the Davis Organization was also in place throughout the school year for periodic meetings and phone consultations. The strategies were such that a classroom teacher could incorporate them into the existing reading curriculum (Davis, 1994). For example, additional materials were clay, dictionaries, Koosh Balls, and trays for the Symbol Mastery portion of the pro-

gram. Alphabet strips, letter cards and punctuation booklets were also needed and provided at the workshops.

Dependent Variables and Measurement Procedures

At the beginning of the first grade, all students were assessed on a basic list of 100 sight words (see Figure 1). Each list was then divided into 10 words. If a student scored above 80% on that list, the next list was then administered. At the point a student scored below this level, the testing was terminated. The number of students who could read 80% or more of the words as well as the number of students who could read less than 80% was calculated.

Figure 1
Basic Word Assessment

List 1	List 2	List 3	List 4	List 5
I	at	into	all	back
we	on	he	out	him
go	it	now	may	made
you	is	an	your	like
not	who	my	then	after
a	can	up	that	has
and	see	here	to	it
will	the	of	by	stand
me	in	be	had	than
do	so	this	for	down
List 6	List 7	List 8	List 9	List 10
as	away	but	no	much
are	why	while	did	there's
from	their	none	cannot	neither
front	some	us	either	put
off	have	they	come	whose
one	last	through	how	without
them	was	what	we're	leaving
she	where	when	should	least
before	her	there	more	saw
onto	or	which	such	whether

ed.

The percentage correct was calculated by dividing the number of correct words by the total number of words and multiplying by 100. All posttesting was done at the end of the school year using the same criteria.

Three years after the study, the number of referrals for special education and gifted programs were also counted for the students enrolled in the classrooms.

Design and Conditions

A pre/posttest control group design with matching was employed. For each Davis classroom there was matched control group within the school building. The control group classrooms followed the same reading programs as their counterparts, but without the Davis Learning Strategies used to augment instruction. The Davis Learning Strategies were sequentially integrated into the reading curriculum. The introduction of each strategy was dependent upon mastery of the previous skill. Initial instruction groups were 15 to 1 for the Symbol Mastery portion of the lesson. Students generally worked in small groups of five children to one adult. Each student worked approximately two hours twice weekly during reading instruction.

All students were first taught a series of focusing skills. These skills provided the students with the self-directed ability to be physically and mentally focused on the learning task at hand. For example, the concepts of self-control for focus, appropriate energy level and responsibility for learning were taught and stressed.

The main portion of the program evolved around Davis Symbol Mastery,

a method in which children created letters, punctuation marks and basic sight words after having looked up the pronunciation and definition in the dictionary. This was accomplished with the use of clay. Creating, discussing and mastering the high frequency core words beyond simple word recognition allowed the students to think with the meaning of each abstract word.

Teachers from the pilot classrooms all received 30 hours of training from the same licensed Davis Training Facilitator on the fundamentals of the Davis Learning Strategies. This training included principles, theories, methodology, and classroom management strategies. Specialized training was also made available to instructional assistants and parent volunteers.

Following the pretesting in the fall, each first grade teacher began the implementation of the Davis Learning Strategies in their respective classrooms. Each school staff met with a mentor throughout the year during weekly planning sessions. The teachers kept time sheets to document the hours spent using the Davis Learning Strategies. The strategies were integrated into the existing reading program in each building. This required minimal additions or changes to the classroom structure or materials.

Reading strategies provided a method for instructing students in word recognition and comprehension. Teachers were instructed in the use of these reading strategies during the workshop. They focused on tracking skills, accuracy, recall, and comprehension. These reading methods were used to supplement the current reading programs in place in each setting.

Reliability of Measurement

For reliability of measurement, two independent testers, who were substitute teachers from another district, were trained to give the pre and posttest evaluations on all of the participants in the study. The testers were not aware of which classrooms had received intervention. Also, a third person rescored all tests to ensure accurate scoring. Agreements were determined when both recorders scored the work in the same manner. A disagreement was noted if there was any discrepancy between two graders. Reliability was calculated using the point-by-point agreement formula in which the number of agreements was divided by the number of disagreements and multiplied by 100 (Kazdin, 1982). The

percentage of interobserver reliability in this study was 100%.

Results

Scores were assigned ranks using the Mann-Whitney (Siegel, 1956) statistical method. "T" scores were calculated to determine the size of the difference between any given pair of pilot and control groups. Values exceeding a maximum value (for positive values, about +1.50) or minimum value (for negative values, about -1.50) to show confidence between the two groups are significant. The same statistics were run on the groups who scored less than 80% on the pretest. The means and standard deviations for each pilot and control classroom are presented in Table 1.

Table 1
Mean and Standard Deviation by School for Pretest LTEQ 80%

Word Recognition for Blocks of Ten Words (10 blocks of 10)	Pre Mean	Pre SD	Post Mean	Post SD	Gain +/-
M Pilot (n=10)	2.11	1.67	10.0	0.00	+7.89
M Control (n=18)	2.70	1.25	8.27	2.70	+5.57
G - 1 Pilot (n=17)	1.65	0.93	9.47	1.18	+7.82
G - 1 Control (n=14)	1.79	1.93	7.60	3.10	+5.57
G - 2 Pilot (n=13)	1.92	1.04	9.46	1.39	+7.54
G - 2 Control (n=14)	1.21	0.75	7.64	3.10	+6.43
All Schools Pilot (n=40)	1.97	1.11	9.70	1.09	+7.73
All Schools Control (n=46)	1.78	1.57	8.02	2.91	+6.24

For the "M" first grade setting posttest results showed 10 students on the pretest scoring less than 80% on the list of 100 words. On the posttest all of the students (n=10) scored 100% accuracy on the word list of 100. The control group for this classroom had 18 students who scored at 80% or less accuracy on the pretest with eight students on the posttest scoring at less than 80% accuracy. The G - 1 classroom had 17 students scoring less than 80% accuracy on the pretest in the pilot classroom, with two students on the posttest scoring with less than 80% accuracy on the word list. The control group for this classroom had 14 students scoring less than 80% with five students on the posttest scoring at less than 80% accuracy. The G - 2 site had 13 students in the pilot classroom scoring less than 80% accuracy on the pretest, with one student remaining at less than 80% accuracy on the posttest. The control group for this classroom had 14 students scoring at less than 80% accuracy on the pretest and five students scoring less than 80% accuracy on the posttest. Students scoring below 80% on the posttest would indicate an early concern for possible referral for support services such as special education.

The follow-up data taken three years later (1998-1999) from the pilot classrooms indicated no special education referrals from any of the three pilot classrooms as of spring quarter of their third grade year. GATE referrals (gifted and talented education) for these classrooms are statistically larger than would be expected. M - 1 had 11 GATE referrals. The G - 1 and G - 2 settings, which are of lower SES, showed G - 1, eight GATE referrals and G - 2, three GATE referrals.

Discussion

Students who were in the Davis Learning Strategies (Davis, 1994) classrooms showed significantly higher accuracy on tests of basic sight word recognition. Fewer students in each of the pilot classrooms were considered a focus of concern at the end of first grade. Follow-up data taken during their third grade school year did show that none of the students from the Davis Learning Strategies classrooms had been qualified for special services. In keeping with the philosophy of Neverstreaming (Slavin et al., 1991), these at-risk students have not fallen behind their peers by the end of third grade. According to statistics (Hall & Moates, 1999), children who are behind by the end of third grade have only a 1:5 to 1:8 chance of every catching up.

Early and continued failure in school can have a devastating effect on the student's self-esteem and motivation. In the classrooms where the Davis Learning Strategies were implemented, teachers reported that student success in learning had a beneficial effect on their self-esteem and willingness to take risks with educational tasks. Students were asked for their reactions to the Davis Learning Strategies, particularly to the Symbol Mastery. Comments included:

- "It made pictures in my head."
- "I learned the meaning of words."
- "It helps me spell."
- "It's fun!"
- "It helps learning."
- "It's creative."
- "It helps me to learn words."

Teachers reported more success in their ability to meet the needs of diverse learners. This tactile-kinesthetic

approach allowed teachers to present the material in an active, creative way, which resulted in mastery of the material.

Economically, for school districts and society, early intervention reducing the need for special education placement is a huge advantage (Slavin, 1992). Students who are qualified to receive special education services have low declassification rates (Kerner-Lipsky, 1992). This translates into years of extra support and dollars being needed for that student. Kerner-Lipsky (1997) discuss the costs of special education. An initial assessment has been estimated to cost \$1,206 per student (Moore, Strang, Schwartz, & Braddock, 1988). For those students receiving special education transportation services, the average cost was shown to be \$1,583 per year. Two separate studies (Moore et al., 1988; Shields et al., 1989) showed that only about 62% of the special education dollars at the local level went to direct special education instructional services. For students with mild disabilities in the resource room programs, an average of 22% of all funds for special education services was spent on assessment and 15% on special education program administration (Shields et al., 1989). Studies show that there is a significant differential in terms of employment abilities and graduates with learning disabilities. Those who stay in school and graduate fare much better than those who leave school. Unfortunately, many students with learning disabilities who drop out of school face an uncertain and grim future in the streets (Zigmond, 1995). The initial cost of a four-day workshop and the expenses of the required materials are minimal in relation to the

numbers of children from these three classrooms who would most likely at this point be in special education. These classrooms were averaging 4 to 5 qualified students by the end of third grade. The skills acquired during the workshop will be continually used in subsequent years with new groups of students.

Data were also taken on 285 (174 were in the pilot group and 111 were in the control group) kindergarten students from five Bay area schools. These results showed mastery of upper and lower case alphabet using the Davis Learning Strategies. However, it was determined that a more discriminating assessment tool is needed for future studies at the kindergarten level, one that goes beyond letter recognition and includes word recognition and early reading ability. The testing conducted was inconclusive due to the fact that so many students from the pilot and the control groups had mastered the upper and lower case letters of the alphabet by the end of kindergarten. Of these pilot classrooms, three have been tracked for follow-up data. Neither of these classrooms have had any referrals for special education as of the third quarter of their second grade. The initial Davis kindergarten AM/PM classrooms $n=30$ (1995/96) produced 17 children in GATE and no special education referrals as of spring 2000 (the end of their fourth grade year). Currently, workshops train teachers how to implement the strategies in large group settings for 1st grade classrooms where there is limited assistance available.

Additional research is needed in other settings with larger groups of children. Testing should be conducted on

a broader range of skills including qualitative reading samples and comprehension. Generalization to other language arts skills should also be assessed. In the future surveys targeting teachers, parents, and children to garner feedback and suggestions would also be helpful. Long-term follow-up to determine the effectiveness of these strategies on State essential learning testing should also be considered. Referral numbers to support services should also continue to be tracked for the students who have also received the Davis Learning Strategies. The possibility of coordinating services for early intervention with existing programs in a building, i.e. Chapter, LAP, or Title I should also be considered as ways of implementing this instruction as well as reducing the student teacher ratio during instruction.

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