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by MARY JO HAND

Research Report

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Research Report
Frog Publications
Drops in the Bucket

No Child Left Behind Act

Since 1997 *Drops in the Bucket* and its related products have been used by *every school* adopting the HOSTS (Helping One Child To Succeed) Learning Program which is **specifically named in the No Child Left Behind Act as an example of an effective program.**

In meetings in Washington D. C. in 2003, 2004, and 2005, Federal Department of Education leaders advised Frog Publications Vice-President and other representatives of the Association of Educational Publishers that secondary research IS ACCEPTABLE for programs using materials whose primary research has not yet been completed. DOE leaders at that meeting also said that the Federal Department of Education has NOT refused funding under the No Child Left Behind Act in any such cases.

In accordance with the information given in that meeting with the Federal Department of Education, this report provides, as specified, this secondary research report. It is the supporting foundation for our primary research underway in conjunction with university staff.

Secondary Research Summary

Introduction

Drops in the Bucket (DIB) is a research-based supplementary material which provides systematic daily practice for skills and reinforcement to promote long-term memory. The systematic daily practice of DIB assures that the commonly taught and tested skills, vocabulary, and concepts will be maintained and strengthened, not introduced then forgotten.

The research basis for DIB is a solid body of research that begins in 1957 and continues to the present. A summary of each of the four research bases appears below, followed by specific research findings, citations, and applications in DIB. The foundations of DIB are evidenced in these four areas:

(1) Applied Behavior Analysis/Behavior Modification/Behaviorism,

(2) The Active Role of the Learner in the Learning Process,

(3) Cognitive Psychology, and

(4) Motivation.

Research Basis 1: Applied Behavior Analysis/Behavior Modification/ Behaviorism

DIB has a strong research basis in applied behavior analysis/behavior modification/behaviorism. This research demonstrates that reinforced behaviors will occur more frequently. The research also demonstrates the powerful effects of schedules of reinforcement on efficient learning.

DIB is based on the principles of reinforcement, and spaced practice using effective schedules of reinforcement. These practices have been research proven in the works of Skinner, Bandura, and many others.

Specific Research Findings, Citations, and Applications

Research Finding: Reinforced behaviors increase in frequency.
Citation: Skinner, 1957; Alberto & Troutman, 1995
Research Application: DIB is a supplemental program which provides the systematic reinforcement needed to increase the frequency of correct responses on the most commonly taught and tested skills and concepts. DIB reinforces behaviors relating to ten essential skills in math or language each day for twelve weeks using specific procedures consistent with research findings and outlined in the DIB teacher instruction pages.
Specific Example: DIB Math Level D reinforces students each day in all of these areas: basic facts, algorithms, rounding and estimating, story problems, equivalent fractions, vocabulary and concepts, fractional parts, place value and numeration, telling time or using money, or using geometry, and for correctly using a ruler. These are ten of the skills common to most math programs, tests, and math standards in use for fourth grade students in U.S. public schools. DIB assures that every one of those skills is practiced and reinforced every day for twelve weeks. By contrast, it is unfortunately common with many math programs that after a skill or concept has been taught, weeks may pass with very little systematic review or practice to maintain that skill. As a result, the skill is weakened or lost entirely.

Research Finding: Intermittently reinforced behaviors persist longer than those that are continuously reinforced.
Citation: Alberto & Troutman, 1995; Skinner, 1957
Research Application: DIB provides intermittent reinforcement. Each skill/concept is practiced and checked once each day. Students receive intermittent social reinforcement for participation and achievement through activities such as Each-One-Teach-One, described in the teacher section of DIB. Intermittent reinforcement also occurs as the students work in DIB mini-groups, and as they apply what they have learned in DIB lessons to their regular class lessons and to real-life situations.

Research Finding: People learn by observing the actions of others. Modeling by teacher and other students through demonstration and verbal description of thought processes results in increased student achievement.
Research Citation: Ogbu, 1987; Pintrich and Schunk, 1996; Bandura, 1971
Research Application: DIB procedures include modeling by teachers during the introductory phase, and by students each day thereafter.

Research Finding: Students are more likely to imitate a model when they perceived the model as being similar to themselves.
Research Citation: Sternberg, 1988; Bandura, 1971
Research Application: DIB procedures include cognitive modeling by teachers during the introductory phase, followed by students modeling for each other each day thereafter during the Each-One-Teach-One segment of the lesson. As students see other students like themselves modeling learning behaviors, they imitate those behaviors and assimilate them into their repertoire of responses. All DIB students are given daily opportunities to model cognitive strategies and to learn how to model correct strategies for others.

Research Finding: Controlled practice (with questioning and feedback) helps students reproduce the behavior being modeled.
Research Citation: Murphy, Weil, & McGreal, 1986; Bandura, 1971

Research Application: DIB includes controlled practice throughout the twelve weeks. DIB begins with extensive teacher modeling for the entire group and continues with teacher modeling as required in the mini-groups. As the weeks progress, student modeling increases and teacher modeling decreases. The modeling is faded as the program progresses in order to promote each student's independence and personal mastery of the skills.

Research Basis 2: The Active Role of the Learner in the Learning Process

Research on the active role of the learner in the learning process provides a second research basis for DIB. There is a preponderance of research evidence that validates this concept of active involvement.

DIB includes teacher directed, cooperative, and independent components to actively involve the learner in the learning process and thereby greatly facilitate learning.

Specific Research Findings, Citations, and Applications

Research Finding: Instructional scaffolding extends the range of learners, allowing independent accomplishment of tasks that would otherwise be beyond their reach.
Research Citation: Rosenshine & Meister, 1992
Research Application: DIB provides all the elements of scaffolding: breaking content into manageable pieces, modeling of the skills (by the teacher for the first three days, then by other students in the Each-One-Teach-One segment), providing practice with support as needed (in Mini-Groups and Each-One-Teach-One) until the student can perform without assistance.

Research Finding: Effective classroom management and organization are essential because they determine how efficiently time is used. In classrooms where students spend more time on-task, successfully accomplishing academic tasks, their achievement is higher. Those students are also more likely to feel positive about the subjects in which they are successful and about themselves.
Research Citation: Fisher, Berliner, Filby, Marliave, Cohen, & Dishaw, 1980; Bennett, 1978; Rutter, Maughan Mortimer, Ouston, & Smith, 1979; Wang, Haertel, & Walberg, 1993
Research Application: DIB lessons use the same organized format and directions each day. This assists the teacher in organizing and structuring the learning time. As a result, students spend *more time on-task* and less time "getting ready." Students are *not only* on-task, but are also *successfully* accomplishing their tasks, because the lessons are at their independent functioning level. These findings explain what teachers often report: that students indicate that they like math more after doing DIB, or that they feel more positive about coming to school.

Research Finding: Automaticity results from repeated successful practice. As automaticity develops, students perform tasks with less effort in less time. Eventually they are able to perform the process with little thought or effort.
Research Citation: LaBerge & Samuels, 1974; Anderson, 1995; Gagne, C. Yekovich, & F. Yekovich, 1993
Research Application: DIB provides repeated successful practice. The more DIB lessons students do, the easier the lessons seem and the faster students can accomplish them. That sets in place a motivation effect to achieve even more.

DIB emphasizes several areas where automaticity is essential to further progress, such as decoding words, understanding word meanings, using standard language forms, fluency with basic math facts, and use of math processes and concepts.

Research Finding: Learning is influenced by social interactions. Cooperative learning methods have increased achievement at all grade levels.
Research Citation: D. Johnson & R. Johnson, 1989; Cohen, 1994; Slavin, 1995; Quin, D. Johnson, & R. Johnson, 1995; O'Donnell & Dansereau, 1992
Research Application: Many DIB levels include procedures for cooperative learning activities created by nationally recognized cooperative learning trainer and author, Theresa Cantlon.

Research Basis 3: Cognitive Psychology

Cognitive research focuses on internal mental processes that influence how students make sense of information and the world in which they live. It includes the processes learners use to gather, organize, store and express information; the ways people perceive and think, and the influence of these factors on learning.

Areas of cognitive research utilized in DIB lessons and procedures include memory, learning efficiency, chunking, automaticity, attention, perception, rehearsal, and metacognition. The application of cognitive learning factors in conjunction with the behavioristic and motivational factors inherent in DIB creates a synergistic effect.

Specific Research Findings, Citations, and Applications

Research Finding: Feedback facilitates learning.
Research Citation: Weinert & Helmke, 1995
Research Application: DIB provides specific feedback to each student, each day, on each topic.

Research Finding: Variety creates learner interest.
Research Citation: Zahorik, 1996
Research Application: DIB lessons always have a variety of different types of problems. Although the format and topics remain the same to provide continuity, the questions are different each day, and the difficulty is gradually increased using the principal of just noticeable difference. This is in contrast to practice sheets which are sometimes boring because they lack variety.

Research Finding: One component of intelligence is the ability to convert information into patterns that can be used automatically and efficiently to solve problems.
Research Citation: Sternberg, 1988
Research Application: DIB motivates students to notice and learn patterns and strategies (students often call them tricks or secrets) by presenting the opportunity to use the strategy every day for weeks. DIB also provides sufficient repetitions to enable students to discover and/or master a pattern or strategy. Teachers may help children make and use discoveries during mini-groups. A specific example is the ruler section of Math DIB, Level D. Students must name or locate points on a standard ruler, such as 41 and 5/8 inches. DIB's daily practice leads students to discover for themselves or learn from Mini-groups how to use the patterns of the ruler marks as shortcuts to efficiently name or locate any fractional point. Students are motivated to find and master a strategy for reading a ruler--they know they will have a use for the strategy each day for twelve weeks to solve new measurement problems. Some students have never before had sufficient spaced opportunities to learn the patterns in reading a ruler. At first, some succeed only with great effort, thought, and concentration. With DIB, learned strategies are used day in and day out and become effortless. Skills and strategies are never just "presented" then neglected.

Research Finding: Facility in encoding and remembering new information is related to the strength of the knowledge base. (It's easier to learn something new if you already possess some relevant background information.)
Research Citation: Rosenshine, 1997; Pressley, Borkowski, & Schneider, 1987
Research Application: With DIB, students build a solid knowledge base by practicing each day ten of the most essential reading or math skills for their review level and by developing automatic strategies they can apply to new, similar problems each day.

Research Finding: Redundancy of review (overlearning) is particularly helpful in retaining principles and concepts.
Research Citation: Brophy & Good, 1986; Shuell 1996
Research Application: DIB continues to review each concept or skill every day for up to twelve weeks. This puts success in the reach of more students, including those who need more repetitions to finally consolidate the information into long-term memory!

Research Finding: Practice is a component of almost every model of instruction.
Research Citation: Rosenshine & Stevens, 1986; Good, Grouws, Ebmeier, 1983; Hunter, 1982
Research Application: DIB provides practice, practice, practice. DIB practice is varied, interesting and motivating. DIB practice is correlated to test objectives and major instructional programs.

Research Basis 4: Motivation

Motivation is the essential fourth area of relevant research. This research demonstrates that as the student achieves success, motivation increases.

To assure success, DIB is hierarchically arranged. That is to say, each lesson builds on the preceding ones in very small, sequential steps. Initial DIB placement is at the student's independent level. This offers the opportunity for success and progress to students starting at various levels. This is in contrast to the unfortunate practice of placing students at frustrating levels that leave them feeling defeated.

Finally, DIB instructional procedures promote independence as much as possible, and provide safety nets of support (Each-One-Teach-One and Mini-Groups) so no child is left to flounder and fail. Student success with DIB sets in motion an upward spiral of motivation and accomplishment.

Specific Research Findings, Citations, and Applications

Research Finding: An increase in achievement is followed by an increase in motivation.
Research Citation: Clifford, 1990; Pintrich & Schunk, 1996
Research Application: Students using DIB are very likely to be successful on a majority of the ten tasks because they are placed at their independent level and effective scaffolding is used. Success with the skills they can do motivates them to accomplish the other tasks, too. The Mini-Group procedure assures that more and more skills will be mastered as the days go by, each one bolstering motivation.

Research Finding: Success is directly correlated to a positive self-concept.
Research Citation: Scarpatti, 1987
Research Application: Student success with DIB contributes to a positive self-concept.

Research Finding: The two biggest problems facing beginning teachers are classroom management and motivation.
Research Citation: Veenman, 1984
Research Application: DIB assists teachers with these two challenges. DIB provides a structured program that motivates students to perform well on ten academic tasks at each level. DIB provides an organized and motivating approach to each day establishing a student mental set of on-task behavior which is carried forward into the day. Having the students begin their day with DIB also reduces teacher stress and frees the teacher to attend to other necessary duties of classroom management.

Product Information

Drops in the Bucket teacher resource practice books are published by Frog Publications, 11820 Uradco Place, Suite 105, San Anotnio, FL 33576. A wide range of math and reading/language levels is available for elementary and middle school students.

Call (800) 777-3764 for a free product catalog or sample pages book, or visit the website at www.frog.com. To see sample pages on the website click on the listing <u>*Drops in the Bucket*</u> at the left side of the homepage. This will bring up a list of all *Drops in the Bucket* for all levels and subjects. Scroll down the list and click on the one you wish to view. When the page for your choice opens, click on the words <u>View Sample Pages</u>. To obtain information regarding the new *Writing Drops in the Bucket*, click on

<u>Writing</u> in the home page list.

The premise of DIB is *that students become very good at those things which they practice a little every day.* Throughout years of successful use of DIB, this premise has continuously proven itself to be true. Updates and revisions are made to DIB to assure content validity. This means that the vocabulary, skills, and concepts in DIB match the modern curriculum and match what is currently included in major tests and programs.

DIB books may be used in a variety of ways. To use them as workbooks, order one per student. This is most common in special education settings, summer or remedial programs, and in math programs. DIB student pages from the teacher's copy may be used as masters for reproduction for use in ONE CLASSROOM ONLY. In this case, order one copy per teacher of each of the levels the students will need. For use by multiple teachers, order multiple copies. For schoolwide use, a Drops in the Bucket Site License offers virtually unlimited reproduction for a period of years. Call (800) 777-3764 for Drops in the Bucket Site License information.

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