

## **THE COMPREHENSIVE APPLICATION OF BEHAVIOR ANALYSIS TO SCHOOLING (CABAS®)**

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**ABSTRACT:** Using a university-based training model, CABAS provides teacher training, supervisory support and administrative support to implement a system or school-wide program for students with various disabilities including visual impairment, mild to profound mental retardation, autism, learning disabilities, and emotional disturbances and has also been used to mainstream students. CABAS-trained teachers provide academic instruction and classroom behavior management based on a combination of technologies developed through scientific research in applied behavior analysis. These technologies include Direct Instruction, Precision Teaching, and PSI (Personalized System of Instruction) for staff and parent training. Instruction is individualized and based on measurable objectives. Supervisors provide teacher training and assist with data collect in the classroom. Teaching is adjusted as needed based on student performance. In a range of studies over 15 years, CABAS students made greater gains than non-CABAS students with smaller special education placement and significant cost reductions.

### **Background**

The Comprehensive Application of Behavior Analysis to Schooling (CABAS®), developed by R. Douglas Greer and colleagues of Teachers College, Columbia University, is an instructional technology based on the system-wide application of scientifically validated educational practices.

A critical factor in school innovation is the capability of schools to implement improved instructional methods and to maintain their use over time so that effective pedagogical practices characterize the school and do not diminish (or disappear completely) with the passage of time, administrators, and teaching personnel. CABAS® deals with these issues through the incorporation of procedures that address student learning, development of teachers' instructional skills, supervisory support for the practice and use of these skills by teachers in the classroom, and administrative support for these supervisory activities.

Involvement of a university-based consultant is an inherent element of the CABAS® model. Implementation of the system addresses the University's need for model classrooms in which graduate students may learn innovative new instructional technologies, with benefits to the school stemming from continuing involvement and support from expert University staff. Currently there are three programs offering this

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tramm and consulting: the Columbia University Teachers College Program in Behavior Analysis and Behavior Disorders, the Fred S. Keller School in Yonkers, New York, and the Margaret Chapman School in Hawthorne, New York.

Over the past 15 years, CABAS® has been implemented and tested in schools and classrooms serving children with a wide range of disabilities including visual impairment, mild to profound mental retardation, autism, learning disabilities, and emotional disturbance. The model has been applied to eight schools or programs within schools. In addition, CABAS® has been used to mainstream students, and there are 15 CABAS® classes housed in regular education schools. As CABAS® deals with pedagogical and management methods and curriculum design for individualized instruction and is not restricted to specific categorical or developmental classifications of learners, it is equally applicable in regular and special education settings.

CABAS® was derived from extensive research on effective educational practice including Direct Instruction, (Englemann & Carnine, 1982), Precision Teaching for emphasis on rate, accuracy, and measurement, (Lindsley, 1990), Personalized System of Instruction for staff and parent education and for students with reader-writer repertoires, (Keller, 1968), Programmed Instruction for computerized instruction when available (Skinner, 1984), and Ecobehavioral Analysis to analyze instruction (Sulzer-Azaroff & Mayer, 1986). The components of CABAS® also reflect emphasis in findings from the literature on effective schooling and school supervision (Cotton & Savard, 1980; Edmonds, 1979; Stallings, 1980).

### Program Description

CABAS® is a learner-driven, system-wide or school-wide approach to education based on the comprehensive application of the science of behavior analysis to all of the roles of schooling: students, parents, teachers, psychologists, speech therapists, social workers, supervisors, administrators, and university training sites (Greer, 1996). Because it is a systems approach, the specific features of the model continue to evolve based on the characteristics of each school in which it is implemented.

In CABAS®, existing skills are identified for each student and an individualized, criterion-referenced curriculum is developed. The curriculum is decided jointly by teachers, parents, and other involved parties and identifies immediate and long term instructional objectives. The scripted curricula are made up of "learn units," which include: teacher presentations, accurate student responses, and how the teacher should respond depending on whether the student response is accurate or inaccurate. All student responses and all objectives achieved are measured and graphed. Assessment of students' performance is *curriculum based*, that is, based on the achievement of instructional objectives. The major divisions of instruction used are academic literacy, self-management, problem solving, and enlarging the preferred activities of students to include those which support academic growth, for example, "love of literature."

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Teachers are taught, through in-classroom instruction by supervisors, to present curricula consistently, reinforce appropriately, record student responses reliably, and graph results immediately. Each teacher is also assigned modules or study units covering instructional methods. There are both reading objectives and related on-the-job performance objectives for the methods which must be mastered. Teacher promotions and merit pay increases are contingent on teachers increasing their mastery of the methods and progress in their effectiveness based on improved learner outcomes. The primary basis for measurement of student performance is achievement of instructional objectives and the primary basis for measurement of teacher instructional performance is the provision by the teacher, in the classroom, of learn units and related criterion-referenced objectives achieved by students. With regular and continuing feedback from supervisors, information on instructional objectives achieved is used as the basis for curricular changes and information on teacher performance is used to enhance their performance. When students encounter learning obstacles, teachers may receive support from supervisors who function as teacher coaches/mentors.

A related curriculum is used for parent education in which parents are taught how to work with their own children, teaching them social, academic, and play skills, and individual responsibility, using positive parenting practices.

Supervisors, who are also provided with special training, train the teachers and assist them in training teacher assistants on the job. Supervisors observe, record, and graph student and teacher behavior in the classroom and provide feedback to the teachers during the observation periods. Supervisors also maintain a log of their own accomplishments of administrative and supervisory tasks according to pre-established criteria, ensure that data and summaries are up to date for all graphed student and teacher observations, and provide a periodic summary to the University-based consultant.

## Evaluation

An evaluation of CABAS® was conducted at PS#176 by independent researchers for the New York City Board of Education. In their study, they compared a first-term CABAS® classroom for students with autism with control classrooms across a six month period. Students in the control classrooms gained an average of five months, while the students in the CABAS® classroom gained an average of 11 months.

The model has been in place for 15 years in one school and ten years in another. Data for all students on all student responses to instruction received and criterion referenced objectives achieved have been maintained in an archival record from the outset in each school. The existing follow up data have been positive. For example, between 55% and 75% of the graduates of the Fred S. Keller School remain outside of special education. Greer, McCorkle, and Williams (1989) studied CABAS® applied in a school for a year and found strong relationships between (a) number of instructional trials (learn units) received by students and attainment of learning

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objectives, (b) number of weekly teacher observations and number of learning objectives achieved by students in the observed teachers' classes, and (c) teacher provision of accurate reactions to student responses in weekly observations and number of learning objectives attained by all children in the teachers' classes. Ingham and Greer (1990) found that use of the CABAS® teacher-performance observation procedures by a supervisor resulted in significant increases in total learn units taught and correct responses by students in the observed and other settings. Albers and Greer (1991) found that, for four junior high school students in need of special instruction in mathematics, increased instructional use of learn units resulted in increased correct rates for student responses but that incorrect rates remained relatively low.

Selinske, Greer, and Lodhi (1991) implemented and followed CABAS® across four groups of teachers in a small school for two years. They found from 2-fold to 5-fold increases above pre-CABAS® rates in the weekly rate of student objectives achieved for three of the teacher groups and no change for the fourth group (which had completed less instructional quizzes than the other teacher groups). Lamm and Greer (1991) reported on a replication of Selinske et al. at an Italian school for children with multiple disabilities and found that the students, teachers, and supervisors at the Italian school achieved results comparable to other CABAS® schools.

In summary, the model has met its stated goals with respect to improved rates of student achievement and enhanced teacher skills in all programs in which it has been implemented. Educational funds in the existing schools have funded the program and research has been a natural outcome of the model. Cost-benefit analyses show significant benefits (Greer, 1994a, 1994b). In comparisons done with comparable students, CABAS® tuition costs have been either less than or equivalent to those of the non-CABAS® programs. However, when the cost per learn unit and the costs per instructional objective were compared between CABAS® and non-CABAS® schools, the CABAS® programs were significantly more cost-effective. For example, learn units costs 65 cents in one CABAS® program and more than \$10 per learn unit in one comparison school (Greer, 1994b).

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