Cognitive Skills Training Improves Listening and Visual Memory for Academic and Career Success

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1990 ushered in the "Decade of the Brain" and with it came research to further explore how intelligence can be improved. Intelligence requires high levels of information processing capability for an individual to excel academically, and rapidly learn systems and new technologies in the workplace (Sternberg, R. J., 1990).

When we cannot quickly process complex information and think critically, we find ourselves behind in world economic competition, at the bottom of the educational ladder, and not qualifying for better paying jobs. Trapped at certain career levels, we wonder how to increase income and job satisfaction.

Searching for answers, we overlook the obvious: we must create a process for learning (Creating The Future, Dickinson, 1991) and increase mental proficiency. Individuals now can reach optimum levels of learning capability through a specialized training procedure. Problem-solving and critical thinking cannot be left to chance or incidental workbooks and seminars. We must look at the foundation of learning: *training information processing, thus creating higher levels of intelligence and critical thinking* (Sternberg, R. J., 1992).

Available Cognitive Skills Training Programs

From the late 1950s, into the 1980s, two significant cognitive skills training programs existed: (1) Reuven Feuerstein's *Instrumental Enrichment/Mediated Learning (IE/ML)* (Feuerstein, R., 1980, 1956), and (2) Mary and Robert Meeker's *Structure of Intellect (SOI)* (Meeker, M. N., 1969) which was applied in Japanese schools from the 1970s until today.

A third cognitive skills training (curriculum-and-instruction, C & I) program, ***The Bridge To Achievement (BTA)*** (Erland, J. K., 1994a) is available for schools, businesses, centers, and industry. Since 1981, learning specialist Jan Erland, has researched, developed, and implemented ***The Bridge To Achievement (BTA)*** cognitive skills training curriculum for individuals ages 9-adult. The multi-media program features 24-hours of intensive encoding-decoding drill and practice sessions to develop information processing capability.

Before students can comprehend reading material and technical text, perform step-wise procedures in mathematics, follow directions, understand science and a foreign language, they must have adequate listening and visual Short-Term Memory structures. With many students and workers, these skills are underdeveloped. Most curriculums do not address these mental abilities. Auditory Memory (listening) training programs are few, and often require individualized instruction with a Speech Pathologist. Therefore, the average student flounders when trying to learn typical course content and office procedures, due to low listening comprehension ability.

The BTA objectives are to improve memory and cognitive skill functioning for all students, at every learning level. Thereby, students can follow oral and written instructions quickly and accurately, develop an increased accuracy for visual and written detail, develop organizational skill, perform numerical computation problems accurately, read and understand complex information, interpret charts and diagrams, and think critically. *Pattern-Detection* and *Sequencing-Skill* Training promotes being "Quick on the Uptake" when learning new material for systems and technologies. By rapidly encoding and decoding information, high retention rates result (Kamhi, A. G. & Catts, H. W., 1989; Sternberg, R. J., 1985).

The media program is available in four training formats: 10- or 15-Day for small group intensive (2 ½ and 1½ hrs. daily, Mon-Fri, respectively), a 5-Week (1 hr. daily, Mon-Fri, for colleges), and 8-Week for group training in schools or industrial settings (35 min. daily, Mon-Fri). Field testing statistically documents substantial academic results in reading comprehension, vocabulary, math computational skills, math concepts, ability to follow directions, and problem-solving. ***The BTA*** curriculum can supplement whole-language and mathematics curriculums in schools and learning centers, and can serve as an adjunct program to workforce training in business and industry.

The Meeker *Structure of Intellect (SOI)* program (Meeker, M. N., 1969), used in schools and for the workforce, applies visual workbooks with computer software applications. The Feuerstein *Instrumental Enrichment/Mediated Learning (IE/ML)* program (Feuerstein, R., 1980, 1956), also implemented primarily in schools, applies visual workbook lessons.

The Bridge To Achievement (BTA) builds upon this instruction by adding auditory components forming an interactive multi-media technology. Innovative coding and chunking drills on computer programs and video- audio-tapes with worksheets, pave the way to higher-order thinking.

Media Applications Offer Entertaining Instruction

Albert Bandura's Social Learning Theory (Bandura, A., 1971) principles state that if material is interesting and motivational, a person will retain it. Bandura's precepts and J. Piaget's Theory of Intelligence (Piaget, J., 1950) require models with star qualities to enhance learning. This media

method is an application of Kaufman & Kaufman's Simultaneous vs. Sequential Dichotomy (1983). Global right-brain learners learn to think sequentially. Analytical left-brain individuals learn to engage in global, visual thinking. The rapid shifting of global, patterning input to sequential output, through the video and audio chunking systems, facilitates whole-brain learning (Erland, J. K., 1994b, 1992, 1989a).

The Bridge To Achievement's exclusive chunking system offers instruction for left-brain sequencing of complex information basic to algebra, reading comprehension, written communication, procedures, spelling, computer processing, and critical thinking.

The multi-media system, ***The Bridge To Achievement*** (Erland, J. K., 1994a), applies these theories using celebrity identities. A comic art theme dominates. Vivid, live action characters, mimicking celebrities, teach how to chunk information on video.

By choosing and identifying with favorite celebrities, the student eliminates self-consciousness when speaking with the characters (Decker, P. J., 1985). Through this personality identification, the participant models after the video characters.

This synthesis- sequencing rotation of the voices and faces (encoding-decoding of patterns and systems) is the basis for ***The Bridge To Achievement's*** training. The technology of using vocal intonation by the five character impersonators expands upon Suggestopedic (Lozanov, 1978) accelerative learning. The video- and audio-tape technology can be developed into CD-ROM applications.

A Solid Research Base

Two published research reports (including longitudinal results, Erland, 1989a, 1989b), on the application of ***The Bridge To Achievement*** System indicated that 40 experimentals, ages 10-55, made robust improvement on standardized cognitive skills test measures. Test instruments for the pre- and post-tests included the Detroit Tests of Learning Aptitude-1 (Baker & Leland, 1935; 1967), and the Woodcock-Johnson Psycho-Educational Battery (Woodcock, R. W., & Johnson, M. B., 1977). The entry level intellect of the 40 ranged from developmentally disabled to gifted. Fifteen were learning disabled with a variety of learning problems.

Participants were assigned to small instructional groups according to age and pre-testing entry ability levels. They practiced *Pattern-Detection* and *Sequencing-Skill* training lessons, 90 minutes daily, five days a week, for three weeks. This included 24 hours of intensive encoding-decoding sensory integration training, excluding assessment time.

Post-treatment assessment immediately followed the training, and additional longitudinal testing one-to-three years post-training. All ability levels, from low to high, benefited from the training by increasing their information processing capability.

The Gifted students, including some Gifted-Dyslexics, excelled in school. They have entered professions, or embarked on prestigious careers. The Learning Disabled went on to college or technical school and, without tutorial assistance, graduated and obtained self-supporting jobs. Some became professionals. IQs increased by 20 - 40 points. There were no failures in the ***BTA*** treatment group, and the improvement was enduring.

A subsequent data-base of 523 individuals ages 9 - adult was administered the Woodcock-Johnson Psycho-Educational Battery (1977). Before the training, the group's average was at the 64th percentile in visual processing, and at the 58th percentile auditory memory processing. Following ***The Bridge To Achievement (The BTA)*** training, the average was in the 84th percentile for visual memory processing, and in the 89th percentile for auditory memory processing. The published longitudinal report verified that memory and thinking retention maintained.

A fifth grade public school class of twenty students made up a field test study (Erland, 1994b). A no-training control group was randomly selected from the teacher's previous four of fifteen teaching years. The experimental fifth grade class had the media-driven *Pattern-Detection* and *Sequencing-Skill,* ***The Bridge to Achievement*** training; the other group did not. ***The BTA*** training was for 30 minutes of chunking practice of encoding and decoding lessons. Training continued four days a week, for 12-weeks in the Spring semester.

Achievement was measured by the Science Research Associates (SRA, 1985) standardized achievement tests. Changes were stated in standard scores. To test the hypothesis that training would affect Reading scores, students' pretest and posttest percentile scores on the SRA (1985) achievement tests were first converted to standardized, Normal Curve Equivalents (M=100, SD = 15). Then, separate ANCOVAs were calculated for Reading, Mathematics, Language Arts, Social Studies, Science, and Reference Skills. Consistent with prediction, video-training students evidenced greater Reading improvement than did no-training students, $F(1,35) = 10.16$, $p < .003$ (Grade Equivalent or GE gains were 3.7, for Experimentals, and 1.76 years for the Controls).

Although not predicted, a similar pattern was also evident for Mathematics, $F(1, 35) = 18.24$, $p < .001$ (GE gains were 3.22 for the experimentals and .95 for the Controls). Between-group differences for Language Arts, Social Studies, Science and Reference Skills did not approach significance.

The standard score gains in Reading and Mathematics for the entire Experimental group were strongly correlated, $r(18) = .67$, $p < .001$, whereas this correlation was not significant for the no-treatment group, $r(16) = .38$, $p > .10$. Although not predicted, this finding suggests that the shared variance of Reading and Mathematics gains was due to *The Patterns and Systems* video-taped training.

The class began the school year with a Mean fifth grade ability, and left with a Mean functioning level between eighth - ninth grade in Reading and Math (Erland, J. K., 1994b).

The Reading and Learning Disabled students in this experimental fifth-grade classroom setting also showed marked improvement. Special Needs students' improvement exceeded that made by the Control group by at least one years' growth in both Reading and Math. By junior high, several had their RD/LD classifications removed, and became independent learners (Erland, J. K., 1992).

Longitudinal data was obtained for 16 of the 20 students in this pilot fifth-grade study, for the two years subsequent to the training. Data showed the gains maintained. The students were still performing at elevated eighth to ninth grade levels in Reading and Math in the following sixth and seventh grades .

Information Processing Is Foundational To Learning Achievement

Many learners have difficulty with mathematics and science, and are unaware that their underdeveloped visual and listening memories contribute to low achievement in these areas. As few as 15% of high school seniors enroll in calculus, physics and chemistry (Staff, Nation At Risk, 1983). With Information Processing skill fundamental to learning proficiency, (Sternberg, R. J., 1985) administrators, teachers, and trainers must identify workable systems not only to ease demands and their own work load, but to achieve the necessary academic results for Outcome- Based Education and Total Quality Performance requirements.

Specialized cognitive training is a two-stage process. First, quick, resilient information processing capability, with memory and cognition skill, is required before higher-order thinking skill can take place (Woodcock, R. W. & Johnson, M. B., 1977). When listening and visual sequential memory levels are strengthened, to aid reading and math skill proficiency (Kaufman, A. & Kaufman, N., 1983), then, one can become proficient with science, technological and higher-order thinking skills.

The forthcoming book, *High Performance Thinking: Conquer Information Overload* by Jan Erland, tells us how we can identify our weak mental abilities, understand how our listening and visual Short-Term Memories relate to our personal performance. Mental skill at all learning levels can be improved to process information faster and more accurately. Fast ways to sharpen the mind are explained, so we can eliminate information overload. The reviewed published reports reveal that with continued application, benefits accrue with time. The book includes self-checks with *Patterns and Systems* games, inviting readers to understand how mental toughness and agile thinking leads to peak school and work performance.

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