FORWARD

This research is unusual, is that it is not what you typically see. It is not compiled by an institution or a doctoral student, but rather a learning disability assessment specialist versed in theory and practice at the University of Kansas, recognized as the Number 1 Special Education School in the USA, or perhaps anywhere.

Rather than obtaining a doctorate, in the late 1980s, out of necessity, I created a program to advance my own three children, who are now highly successful professionals in various fields of endeavor.

Although I developed and conducted the program application interactive, multi-media creation, writing, and the full investigation, this research was advised, monitored, compiled, and published in juried scientific journals by five professors/scientists from different research institutions/universities (pp. 19-21).

I began doing multiple field test studies with a variety of demographic groups. Observing unusually high outcomes at onset, both in public school classrooms and in private practice, it was necessary to discover what was creating these results, plus track the evidence with several demographic groups from 1980 until 2010.

Five one-to-three year longitudinal studies resulted. At the important 2001 juncture, I received a research award from the *International Alliance for Learning*. (IAL, June 2001).

The research does not have a concrete research design, but is an aggregate of field test studies. Elements gleaned from multiple cognitive scientists were applied to the instruction. Rigorous individualized and group assessments, (pp. 15-16) were applied using ten standardized cognitive and academic achievement tests. The objective was to find trends between age and ability groups, and to seek the holy grail of generalization to academic and work performance.

This work compiles thirty years of iterative practice with eighteen years of scientific published research that can be found on ERIC (Education Resources Information Center). My acknowledgement and appreciation of these educational-psychology cognitive professionals and scientists is found on pp.19-21.

Multi-Levels of Iterative Brain-Based Accelerated Learning Experimentation, Demonstrate Cognitive Skill Improvement Enhances Academic Achievement and Career Goals

Jan Kuyper Erland

Abstract: This report summarizes past published juried *Journal of Accelerated Learning and Teaching* (JALT and AL) articles (1989-2000) by this author consisting of five generations of cognitive, behavioral, and brain sciences research and development. Research of seven experiments, six published, was conducted at thirteen national test sites, three geographical national areas, and developed over nearly three decades for several demographic groups ages 9-63.

The seven experiments included small and large group individualized training classes; with over 2500 individuals' that had rigorous pre- and-post individualized cognitive skills standardized assessments and evaluations.

Six of the seven experiments had one-to-three years' longitudinal tracking with previously published scientific reporting. The AL whole-brain-exercise instructional methodology that included media, drama, and choral speaking with puppets, chunking, and prosody to improve academic and work performance. Represented is a specific theatrical methodology applying pattern detection with sequencing and chunking systems.

All learning levels were addressed from low to high. Learning deficiencies were remediated with some appearing latently. Those with average- to- strong cognitive-brain areas were further enhanced to higher levels.

The cognitive skills training included a Title I classroom of minority students, a classroom of rural students, and a diversified mix of participants from business, public, and parochial schools, colleges, children, adults, and those with learning disabilities placed in Special Education.

The AL intensive methodology created an "Arts in Education" brain-based instructional model to improve insidious attention, sequencing, visual and auditory speed of information processing and memory deficiencies for all individuals in varying ability level ranges. Consistent learning proficiency improvement was shown regardless of individual genetic variations, developmental differences, socio-economic and environmental factors. Scant few research studies exist on increasing cognitive skill abilities with a specific intervention with diverse groups of individuals that was followed stringently for a number of years longitudinally with multiple testing instruments.

Ten nationally cognitive skills, aptitude, and achievement standardized test instruments were administered and inter-analyzed; both privately and by public and parochial school teams, and evaluations included third-party evaluators. Beginning inn 1981, both cognitive skills tests, both simultaneous (right-brain) and successive (left-brain) subtests along the Level-of-Processing Model (Woodcock R.W., 1978) were analyzed with academic achievement tests. Effect sizes for both cognitive skills and academic achievement improvement for Generations I, II, III, and V were inter-intra-analyzed.

Retrained cognitive skills, for peak brain-learning-fitness, are fundamental to the efficiency of processing visual and auditory memory information for successful school academic achievement and work performance. This extensive research is based upon a prescriptive intensive Accelerated Learning intervention model. The application demonstrated the results of applied theatrical choral speaking within a right- and left-brain patterning and sequencing framework for all tiered levels of learners from very low to high and gifted. The overall hypotheses framework throughout the five generations of research, was through specific AL cognitive skills training, improve the ability to absorb, understand, and retain language and symbolic information quickly and efficiently to increase and maintain higher academic and work performance.

This report is a conclusive nearly three-decades, five generational, summary of a series of previously published research by this author to offer additional scientific cognitive skills training evidence to the existing broad body of Accelerated and Brain-Based Learning principles.

The research has related a cognitive skills intervention methodology that converted those with insidious learning deficiencies into productive learners. Tested in a variety of environments, at twelve research sites, it continuously explored varying demographic ages and abilities, in a variety of settings, through multiple experimental iterations.

The summary continuation will examine what methodologies created significant lasting visual and auditory speed of processing and sequencing memory change that transferred to improved ability to understand, remember, and apply classroom instruction. It will be determined, why the *seven experiments* with the *five longitudinal studies* offer insight for why the training maintained, and why combining various disciplines within the central processing abilities' framework becomes a viable option for continuing application and future research.

Elements from several scientific disciplines utilize the brain's plasticity and the brain's physiological ability to change with 24-hours of stimulation (Hebb, 1949; Rosenwig, Love & Bennett, 1968; Diamond, 1988), the response of the brain to enrichment (Diamond, M.C. 1988, 2001); learning and behavior theories (Bandura, 1971, 1986, 1997; Meichenbaum, D. 1978, 1991; Skinner 1953); the roles of intelligences (Gardner, H. 1985; Piaget's Intelligences Theory, 1950; Sternberg, 1985, 1997, 2001), J. P. Guilford's 128 information processing-intelligence matrices model of 1967 (Guilford, J. P. 1967, 1984, 1986); working memory (Baddeley, 1989, 1993; Howard, 1983); sensory integration (Ayres, 1972); sequential learning through chunked segments (Hessler, G., 1982; Miller, G. A. 1956, 1981; Simon, H. A., 1974); pattern detection (Coward, A. 1990), all woven into the theory of Accelerated Learning through Suggestopedia (Lozanov, 1978).

The topic of intelligence has been controversial for years, and prominent psychologists relate that there are still many unanswered questions for future research to resolve (Editorial Scientific Task Force, American Psychological Association, August 1995). J. R. Flynn (2007, 1987, and 1981) discussed general intelligence has been improving gradually in the world population over the past fifty years due to improved environmental change, which includes education, nutrition, and technological change. But, nevertheless, each individual carries an overlay of information processing cognitive weaknesses to some extent, regardless of improved environmental influences.

Even with education, environmental correlates, and socialization affecting intelligence capabilities (Diamond, 1988, 2000; Flynn, 1987, 2007), a recent study by the University of Michigan (May 6, 2008) confirmed that fluid intelligence, which involves daily problem solving with higher-order thinking skills, can be improved through the training of memory skills for 8, 12, 17, or 19 days. These findings showed that performance improvement increased with the time spent in training, but had no longitudinal maintenance verification.

Yet, this parallel, five generational research demonstrated that like the brain, with its' fluid intelligence, cognitive skills can be further developed, lasts longitudinally, and with added application or usage, can build to even further heights.

The Problem Defined

The inability to process visual and auditory discrimination, closure, and sequencing information efficiently and accurately creates the problems of: inability to follow oral directions, doing multiple choice tests, understanding reading paragraphs, spoken and written communication problems, and performing mathematical functions. Unfortunately, teachers are blamed for these hidden deficiencies within most students, when the brain can be optimized to learn more efficiently.

Hessler (1982) related how central processing abilities were affected by integration of their own aspects when combined with environmental interaction: fine-and gross motor performance, visual perception, auditory perception, nonverbal and verbal conceptual ability. Additionally, with development, aging, education, and socialization variables, Diamond (1988, p. 91) discusses how the brain constantly changes throughout a lifespan, and further operates on a daily basis through health, drugs, medications, and stress variables. Subsequently, brain retraining regimens may be a valuable mental gauge for all ages from early on childhood problems to those in mid- and late in life.

Also playing into this cognitive skills framework is the problem of working memory overload, which includes visual and auditory sequencing ability. According to Baddeley, (1989) refers to the limited capacity that individuals need to maintain information, while simultaneously acting on other incoming information. Subsequently, mental coordination and flexibility is required of both stored and additional incoming information (Leong, Loh, and Hau, 2008).

Initial reactivation can be achieved through intensive right- and left-brain, short-term memory exercise through encoding-decoding rehearsal drilling (Erland, 1980, 1989a, 1989b) for sensory integration (Ayres, 1972). This opens up the two primary sensory visual and auditory memory learning pathways while accentuating other learning modalities; visual learners become auditory learners and visa versa (Erland, 1989a, 1989b).

The Need for a Solution to a Problem for Youth and Adults Alike

Not only younger students often have unidentified information processing weaknesses, but adults, having missed recognition or identification by the schools in the 60s, 70s, and 80s, found they had to cope with unidentified information processing deficiencies with the resultant low self-esteem and workplace pigeon-holing. The adults' life proficiencies depended on nature-nurture, environment-training balance. Those in affluent settings could compensate better than those in impoverished settings.

To further complicate matters, the information processing capabilities of primary, working, and verbal memory decline after the ages of 25-35 in sharp quadratics especially for auditory and visual memory (Grady & Craik, 2000, p. 225). With this being the case, those individuals, both children and adults, found to have initially tested average and low average, or below working memory measurements, have serious regressive memory problems to cope with s they age. Unfortunately, they would not be able to effectively process auditory (listening) or visual incoming information.

Not surprisingly, those tested in these seven subtests had high and low learning profiles; with their own unique brain processing strengths and weaknesses. Understandably, some had hidden areas that were more severely deficit than others for which they were trying to compensate.

To solve this problem of individuals' learning clefts, weak primary and working memory, and information processing blocks, a brain fitness intervention was applied with the arts using drama and choral speaking. The instructional objective was to become a whole-brain learner for rapid information processing and conceptual integration that would transfer to improved academics and work life-skills. If fluid intelligence is increased, innate talent can be released with problem-solving skills.

It will be examined through qualitative and quantitative analyses which improved cognitive skills factors and instructional techniques contributed to these academic and work skill changes, so future predictions can be made.

Five Generations of Research Application

The five generations of research included seven experiments, six published; one an experimental study, six were quasi-experimental studies, and five of the experiments had one-to-three-year longitudinal tracking with published reports. Longitudinal findings are important as quasi-experimental (those without subject randomization) studies can be inconclusive without follow-ups.

There were three alternate twenty-four hour (Rosenwig, Love, and Bennett, 1968) protocols: condensed 10- or 15-Day 2 ½ hours daily, (which included 45 minutes of homework), and a school classroom format of 16-Weeks, 45 minutes daily, which was later condensed to 8 ½ weeks, and 48 days, 30 minutes daily (Erland, J. K. 1985a). The initial Generation I experiments showed that results were obtained with small group sizes with peer modeling. These research questions will be queried:

- What results can be obtained with various group sizes? What is the ideal grouping size?
- Can all age and ability groups benefit in a variety of settings?
- Will enhanced cognitive skill abilities transfer to improved academic performance and work proficiency?
- Which academic subjects can be improved?
- If so, how much improvement, in what academic subjects, when, and at what intervals of time?
- Will visual-spatial processing speed be improved?
- Will results remain over time for all age and ability groups?
- How is Accelerated Learning implemented as an effective training methodology, and how can results remain over time?
- What training attributes create this change in cognitive skills and abilities?
- Will Special Needs students improve in parallel to normal students?
- Can adults improve as proficiently and easily as younger individuals? What is their receptivity to change and intensive cognitive skill rehearsal practice using prosodic speech?
- Which individuals or groups, and under what circumstances, will follow a strict regimen and policy protocol?
- Do all three hour formats (10-Day, 13-Day, and 48-Day) obtain the same results?

Overview of the Five Generations

Generation One (1981-1985)

Experiment I

For the first quasi-experimental studies, there was a wide range of settings; age, ability, and geographical, and Social Economic Status (SES) populations, with many replications from four geographical site locations, in both the private and public sector. Over 1,008 Experimentals were compared to 86 non-treatment controls on seven standardized cognitive skills measures. The Design was a Multivariate Analyses of Co-Variance (MANCOVA). Age groups of 10-15 and 16- adult were divided into slow and fast pace groups. The 40 E's and 40 C's were matched on age and ability levels. The instruments were: The Woodcock Johnson Psycho-Educational Battery, (Woodcock & Johson1978), and The Detroit Tests of Learning Aptitude - & -2, Hammill, (1985). Dependent measures were the posttest scores.

Five subtests showed moderate to high effect size scores on the cognitive skills subtests.

Cog Test #	Test Name	Effect Size
WJ 2	Spatial	.39
WJ 7	Visual Speed	.34
DTLA-2 #16	Visual Mem Letters	.86
WJ 3	Auditory Memory Sentences	.41
WJ 10	Aud Numbers Reversed	.75
DTLA-2 #6	Auditory Mem Words	.89
DTLA-2 #18	Oral Directions	1.97

For Experiment I, the 24-hour application was in a three-week, 15-days, intensive format Mon-Fri, (1 1/2 hours daily class time, which included in-class assessment time, 45 minutes of homework practice). For the first five years of application, (1980-1985) live puppet performances were applied in the training exercises. Subsequently, in 1986, the lessons were transferred into media applications of video- and audio-tape with correspondent computer software applications for reading, with visual-auditory perceptual and sequencing encoding-decoding practice.

Generations Two- to-Three (1986-1995)

With the advent of Generations Two and Three, there was a significant transition from live theatrical applications of choral speaking with puppets and prosody (Blue, 2007; Miller and Schwanenflugel, November 2006) to filmed renditions of the same. Therefore, these two subsequent generations were reviewed together for qualitative and quantitative analyses.

The scientific objective for Generation Two was to document the first published experiment with one- to –three-year longitudinal post-testing to determine if the cognitive skills improvement had maintained over time for a wide range in age and ability levels ages 10-55.

Furthermore, it was to be determined if the methodology had similar out-comes for groups of business and college students ages 21-55 in an intensive 10-Day, 90 minutes of class time, with an extra hour of daily homework practice, for 24-hours of total training.

Experiment II

Experiment II showed the longitudinal 1-3 year findings of Experiment I, seven subtests of the cognitive skills gains on the Detroit Tests of Learning Aptitude-1 (Hammill, D., 1985) and The Woodcock-Johnson Psycho-Educational Battery (Woodcock, R., 1978). The 31-40 previously trained experimental subjects were in a broad age range from 10-55 and ability from special needs, to average, high average achieving, to gifted, and primarily from a middle to working class income environment. Gains held steady from the immediate posts to the delayed 1-3 year posttests, shown on Means and Repeated Measures for six Dependent Variables; four subtests measured successive processing and three subtests measured simultaneous processing. Six cognitive skills posttests were significant at the <.01 level, and the WJ #7 Number Reversals was not significant.

Experiment III

This Experiment was to implement the BTA in-house business and college settings for 329 adult students, ages 21-55, at six national test sites in 10-Day, 90 minute class sessions, which included an hour of daily homework practice. It was the only experiment without longitudinal posttest follow-up. Results of the six demographic groups of adults instructed at six geographical locations using three different instrument measures were tabulated. The same battery of WJ and DTLA-2 cognitive skills subtests were administered pre-posttest, and additionally, the Test of Cognitive Skills (TCS, Sullivan, Clark, & Tiegs) was administered. All tests and subtests showed effect size gains.

Cog Test #	Test Name	Effect Size
WJ 2 & 7	Visual Speed	.50
DTLA-2 #10	Visual Closure	.56
DTLA-2 #16	Visual Mem Letters	.83
WJ 3 & 10	Auditory Memory	.78
DTLA-2 #6	Auditory Mem Words	.67
DTLA-2 #18	Oral Directions	.78
Test Cog Skills TCS	IQ Gain Mean pt = 9.3	.62

Experiment IV

Experiment IV included a classroom of twenty rural public school fifth graders and results were followed for two years longitudinally. A Control group was selected from the teacher's previous class of twenty tested and matched ability-wise. ANCOVAS were tabulated for the same six WJ and DTLA-2 cognitive skills subtests as conducted in Experiments I & II. The twenty Experimental video-training students evidenced larger gains than did the twenty Control group students on all eight cognitive skills subtests. Consistent with the 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 3.76 and 1.76 years, respectively).

Although not predicted, a similar pattern was also evident for mathematics, $F(1, 35) = 18.24$, $p < .001$ (GE gains were 3.22 and .95 years, respectively). On the Science Research Associates (SRA) standardized tests, the Experimental class obtained gains in both reading and math subtests over the Controls, giving the study a baseline and indicator for future investigations.

Experiment V

Experiment V consisted of a Title 1 ethnic minority class of city suburb seven fifth-sixth graders. The research hypothesis was to determine if reading and math achievement could be improved, in sixteen weeks, (24-hours of training) Monday to Thursday, for 30-40 minutes daily. They were inter-analyzed with a subset of seven remedial students in the rural public fifth grade class, and gains were made one-year post longitudinally for four of the seven in reading, and five of the seven in math (tables are available in the full report). The Title I remedials group obtained strong results as a class, some students showed erratic changes, and in varying degrees, ranging from very large to small on the one-year longitudinal posttest.

Generation Four (1996-2000)

Experiments VI and VII

These two Experiments entailed two Midwestern parochial schools, School 1 with 97 students (minority 17%) and School 2 with 172 students (minority 8%). It was a fourteen combined classroom experimental study which included outstanding longitudinal academic achievement results for four experimental classrooms: three fourth grades and a sixth grade. Both schools had control groups, a total of 71 controls. School 1 had a fourth grade comparison group, and School two had two Alternate Media Activity (AMA) control groups of fifth and six graders, who were high achievers, and obtained robust pre- to posttest scores.

The ten-week proposed format was Monday-Thursday, 30-40 minutes per day, but was concluded in eight weeks due to time constraints. Solid gains were made by the “Star” fourth grade experimental classroom (4E3) in all academic achievement subtests, and they, along with the remaining three compliant classrooms (two fourth grades and a sixth grade), showed strong maintenance over the controls.

Two low-achieving fourth grade experimental classes, (4E1 and 4E2), with many students having low auditory and visual processing deficiencies, most students made gains latently. Interestingly, one-two years later, the 4E2 slow class had caught up with the 4E3 fast, 98% compliant class, and the controls’ robust post-test scores and 4E2 & 4E3 students continued to climb past the national norms (when configured into their original groups). 4E1 class had not adhered to coding policy, and eliminated the Latin Roots Cool-Down practice sessions. See following comparison table between 4E2 and the “star” class 4E3 longitudinally with 5AMA and 6AMA controls. Longitudinally, 4E2 and 4E3 passed up the control groups.

Ta Two Low-Cognitive Skills-Performing 4th Grade Classes (4E2 & 4E3) 1- and 2-Year-Longitudinal Comparison
with AMA Controls' Robust Posttests AMA = 19 best media videos/materials to match BTA contents (1996)
Longitudinal scores compared to the robust 5th & 6th Grade AMA controls post-1 year longitudinal scores

	Star
	Mea
	Sco
		4E2 BTA 1-yr long, 5th 1st #
		2nd # is full class
		No. = 20 & 24 full class
			4E3 BTA 1-yr long,
			now 5th grade;
			No. = 14
				5th AMA controls
				immediate post,
				robust
				gain; No. = 26
					5th Norms; Fall 4E
					& Spring 4E3 Norn
							4E2 BTA 2-yr long
							grade;
							No. = 15
								4E3 BTA 2-yr
								long,
								now 6th grade;
								No. = 13
									6th AMA controls
									immediate post,
									robust
									gain;
									No. = 22

Compo		246, 241; + 38-33 pts. Norms; +7 pts. & match AMA	246; + 29 pts. Spring norms; + 7 pts. AMA	239; + 31 pts. Fall norms	4E2-208;4E3-217		261, 259; + 39-37 pts. Fall norms; + 6 + 4 AMA	262; + 33 pts. Spring norms; + 7 pts. AMA	255;+33 pts Fall norm
Read T		245, 240; + 25-20 pts. Norms; +8-+3 pts. AMA	240 + 25 pts. Spring norms; + 3 pts. AMA	237, + 17 pts. Fall norms	4E2-220; E3 -215		255, 248; + 24-17 norms; + 7 pts. & match AMA	257; + 30 pts. Spring norms; + 9 pts AMA	248;+17 pts Fall norm
Math T		238, 233; 19-14 pts. Norms; match & -5 pts. AMA	246; +27 pts. Spring norms; + 8 pts. AMA	238, + 19 pts. Fall norms	4E2-219;4E3-219		253, 253; +21 pts Fall norms; + 2 pts. AMA	265; + 36 pts. Spring norms; + 14 pts. AMA	251;+19 pts Fall norm
Lang T		246, 243 +23 20 pts. Norms; +7, +4 pts. AMA	249; + 26 pts. Spring norms; + 10 pts. AMA	239, + 16 pts. Fall norms	4E2-223;4E3-218		262, 260; + 27 – 2 pts. Norms; & -2 pts. AMA	269; + 38 pts. Spring norms; + 7 pts. AMA	262;+ 27 pts Fall norn
Core T		242, 239 + 21-18 pts. Norms; + 4 + 1 pts. AMA	245; + 24 pts. Spring norms; + 7 pts. AMA	238, + 17 pts. Fall norms	4E2-221;4E3-216		257, 257; + 25 pts Norms; + 3 pts. AMA	263; + 34 pts. Spring norms; + 11 pts. AMA	254;+ 22 pts Fall norn

Generation Five (2000-present)

Further two-year longitudinal comparative data analyses were examined with the fourth and sixth grades compliant classes with the Alternate Media Activity (AMA) controls. The two fourth grade experimental students, with low cognitive skill deficiencies, had one-to- two year latent robust results, and once the results were obtained; they continued to improve over time. The following table denotes effect size comparisons between Generations I, II, III, and V.

Effect Sizes Cognitive Skills

large, medium, and small effect sizes	DTLA 10, Fragments	WJ 2. Spatial Designs	WJ 7, Number Match	DTLA 3, Oral Directions	DTLA 4, Word Series	DTLA 11 Letter Series	WJ 3, Sentence Repetition	WJ 10, Number Reversals
First Generation, individuals, Individual rehearsal. Exp. I & II	test not available	.39 ✦ small	.34 ✦ small	1.97 ✔ large	.89 ✔ large	.86 ✔ large	.41 ✦ small	.75 ✖ moderate
Second Generation, adults, business and college groups Individual rehearsal. Exp. III, higher levels	.56 ✖ moderate		.5 ✖ moderate	.78 ✔ large	.67 ✖ mod	.83 ✔ large		.78 ✔ large
Third Generation, 5th grade, adjusted means, **5th grade**, group rehearsal only. Exp. IV	.62 ✖ moderate	1.84 ✔ large	.61 ✖ moderat	2.99 ✔ large	.14 ✦ smal	2.35 ✔ large	.05 ✦ small	1.22 ✔ large
Fifth Generation, 6th grade, 6 Individual rehearsal compliant. Exp. VI & VII	1.4 ✔ large	basal test onl	basal test only	1.41 ✔ large	1.40 ✔ large	0 ✦ trivial	basal test	basal test on

Interestingly, the academic achievement gains not only maintained longitudinally, as documented by formal evaluative assessments, but comparisons of the experimental sixth grade class (6E3) with the 5th and 6th grades Alternate Media Activity (AMA) control groups that showed immediate robust gains, which fell off longitudinally when the students were reconfigured into their original class groupings when compared to the national norms. Namely, the 6 AMA control class was at higher entry levels pre-investigation than the 6E3 experimental group. The 6E3 BTA students continued to gain progressively above the initial two-four years' increases into the subsequent years, except for the reading subtests that had reached ceiling scores posttest. Longitudinally, 6E3's composite and science reached strong effect sizes of .73.

Four-year academic subject summary comparison for sixth grade experimental class.

6E3 Experimental class vs. 6th AMA controls	Composite & Science	Core Total	Reading Total	Math Comp
Pre- to Post-test	Sig. <.01 .73 Moderate Effect Size ove 6 AMA controls	.65 Moderate Effect Size over 6 AMA	.75 Moderate Effect Size over 5 AMA controls at 6th grade long	Sig. <.1 .75 Moderate Effect size ove 6 AMA controls
1 years Longitudinal	.67 Moderate Effect Size over controls	.80 Moderate Effect Size over controls	.69 Moderate Effect Size over 6 AMA controls; +4 DSS pts. ove controls +40 pts over norms	.69 Moderate Effect Size over controls
2 years Long. no controls' data availabl	+44 DSS pts. over norms	+42 DSS pts. over norms	+37 DSS pts. over norms	+48 DSS pts. over norms

Third generational 5th-6th grade field testing findings reported gains only in Reading and Math subtests, but in the fourth and fifth generational studies, robust academic achievement was found in all-to-most academic achievement subtests over the control groups for adhering classrooms, so further analyses was warranted.

This solid portfolio of cognitive skills and academic measures required rigorous testing, measurement, and evaluation adherence and practice. Evaluative analyses examined how and why results were obtained, what the drivers were to change the behavioral responses, and how they correspond to earlier Journal of Accelerative Learning and Teaching, (JALT) published statistical articles by this author. Therefore, this report is to investigate not whether the treatment obtains solid academic achievement and work performance results, but rather, how and why there are outstanding lasting outcomes, with the inner workings of the brain-building Accelerated Learning methodology over time.

Generational Implementation Summary Chart:

Generation	SES Level & Type	Design	Longitudinal Evidence	Results
First (1984-1995)	All SES Levels - High to Low	Quasi-Experimental MANCOVA	1-3 years Longitudinal Reports	All ages, ability levels had significant gains which maintained
Second (1986-1992)	High to Low SES, Adults; Business and Grad-Student groups		Summative Reports	329 individuals; Careers improved, many success stories
Third (1986-1989)	Low SES, two Title I Schools, fifth grades, including a Remedial Reading class	Quasi-Experimental, ANCOVA and Intra-analyses of seven Special Needs Students	2-year Longitudinal Reports	Large gains in Reading +3.76 annual gain, and Math +3.22 GE gain which maintained. Special Needs reached grade level.
Fourth (1996-2000)	High SES, two Parochial Schools, grades 4-8	Experimental and Quasi-Experimental, 248 subjects, eleven experimental classes, two Control Groups (grades 5 & 6) Alternate Media Activity (AMA) and one comparison group (grade 4)	2-year Longitudinal Reports	Top five training classes, grades 4-6, had +3 to +4 year's gain across academic subject levels that maintained longitudinally. Low performing students reached, and went beyond grade level one- to two-years longitudinally.
Fifth (2001-2008)	Five longitudinal summative findings and conclusions of seven experiments		Summative Reports	Cognitive skills gains transfer to improved academic and work performance and maintain .

Previous experiments included four schools with the following performance, SES and demographic criteria:

Name of School (s) and Geographic Location	Performance Level	SES	Urban or Rural	Minority or Caucasian	Number of Ss
Individuals ages 9-55, at 13 Test Sites	All Levels: High to Low	Mixed	All Areas	Mixed -All	2500
Midwest Public	Satisfactory to Low	Low	Rural	Caucasian	20, grade 5
MO, Midwest Public	Low	Low	Urban Suburb	Ethnic Minority	7, grades 5-6
IA Midwest, two Parochial Schools	All Levels: High, Satisfac	High	Urban, Small Midwes	Caucasian	268, gr. 4-8

Standardized Achievement Test Measures

The following testing instruments were applied for assessment and evaluations by the two school districts and two parochial schools: The Iowa Tests of Basic Skills (ITBS) and its' subtest the CogAT; Hieronymus, A. N., & Lindquist, E. F.,1990, 1974; The Science Research Associates Test

(SRA), 1985; and The Missouri Mastery Achievement Test (MMAT), Osterlind, 1987. These tests were administered by school district personnel, and then scored, tabulated, and reported by national testing companies to the respective schools without the investigator's involvement.

Applied Instruments: Cognitive Measures

Although controversial for years, it was to determine whether cognitive skill blocks could be reliably measured and how these memory processing abilities could play a role in academic performance. And if so, what type of intervention was feasible, and would retain longitudinally.

With these parameters in mind, each student was individually evaluated pre- and post-implementation per design requirements with five different subtests, requiring lengthy individual testing sessions, from the following standardized cognitive skills and aptitude tests to compare with academic achievement: The Woodcock-Johnson Psycho-Educational Battery (Woodcock, 1977, 1978, 1989). Later, this battery was revised, but not used in these experiments: The Woodcock-Johnson Psycho-Education Battery III, Revised (Woodcock, R., McGrew K.S., and Mather, N.1996). See figure 1. Appendix: Woodcock's (1978) Level of Processing Model.

The Woodcock-Johnson Psycho-Educational Battery Tests of Cognitive Skills (Woodcock & Johnson, 1977, 1978); The Detroit Tests of Learning Aptitude-1 and -2 (Hammill, 1985); Wepman Test of Auditory Discrimination (ADT) (Wepman, 1958); The Diagnostic Analysis of Reading Errors; (DARE), (Gillespie & Shohet, 1979); The Learning Efficiency Test (LET I and II) Webster, R. 1992, 1981; and optional, Test of Cognitive Skills (TCS; Sullivan, Clark, & Tiegs, 1981); formerly, The Short Form Test of Academic Aptitude, (SFTAA) based upon The California Maturity Scale to measure high-order thinking skills. If the TCS was selected, a pre-test was administered at the beginning of the 3-Week class with the Wide Range Achievement Test (WRAT-DARE) spelling test. Through this rigorous assessment and evaluation protocol over a period of time with tracking measures, outcomes could be determined.

The post-test cognitive skills tests were administered following BTA and AMA training. As upgrading test revisions became available, many of the original tests and tables were maintained to keep the data base concurrent and cohesive, but nonetheless, new updates were utilized.

Criterion-Referenced Measures

Other open-ended summative measurements were applied on a more frequent schedule and included: student booklets with handwriting samples for the written lessons, kept as self-monitoring diaries, teacher logs, evaluator's visitations with written reports of the classroom sessions, and video-tapes of the applied lessons. Case studies work samples of individual students for strengths and weaknesses were conducted. This allowed for inter- and intra-student comparisons. Daily improvements were monitored. Dramatic handwriting, spelling, math, and reading changes were noted after twenty hours of rehearsed instruction.

Short-Term Objectives Designed To Improve All Students':

- Ability To Read Faster and Understand More (Kamhi & Catts, 1989; Miller & Schwanenflugel, Nov. 2006; Rumelhart, D. & McClelland, J. 1986).
- Numerical Precision; Mathematical Calculation and Problem-Solving Ability (Gardner, H. 1991, 1985; Coward, A., 1990; Sternberg, R. J., 1985; Kline, M., 1999).
- Ability To Learn Complex Procedural Information (Recanati, F., 1993; Sternberg, R. J., 1990; Berger, D. E., 1987; Beyer, B. K., 1987; Marrett, C. B., 1986; Miller, G. 1956; Simon H. A., 1974). i.e., encoding - decoding computer programs, office procedures, science, math.
- Accuracy for Detail in Written Work (Devine, T., 1982; Flower, L., 1987; Strong, W., 1983).
- Verbal and Written Communication Ability (Olson, J. L., 1992; Erway, E. A. 1984; Stridher, S. N., 1988; Strong, W.,1983; Simpson, G. B., 1991).
- Listening Skills and Ability to Remember Important Instruction (Meeker, M., 1991; Gilmore, T. Madaule, P. Thompson, B. 1988).
- Thought Organization for Lessons and Projects (Klahr D. & Kotovsky, K., 1989; Sternberg, R. J. 1988; Sridher, S. N. 1988; Beyer, B. K. 1987).
- Concentration and Focus (Baddeley, A. D., 1993; Gardner, H., 1991).
- Confidence, Motivation, and Enthusiasm for Learning (Cormier, S. M. 1986).
- Overall Intelligence and Critical Thinking, with an Increased Ability to Learn Faster (Ceci, S. J.,

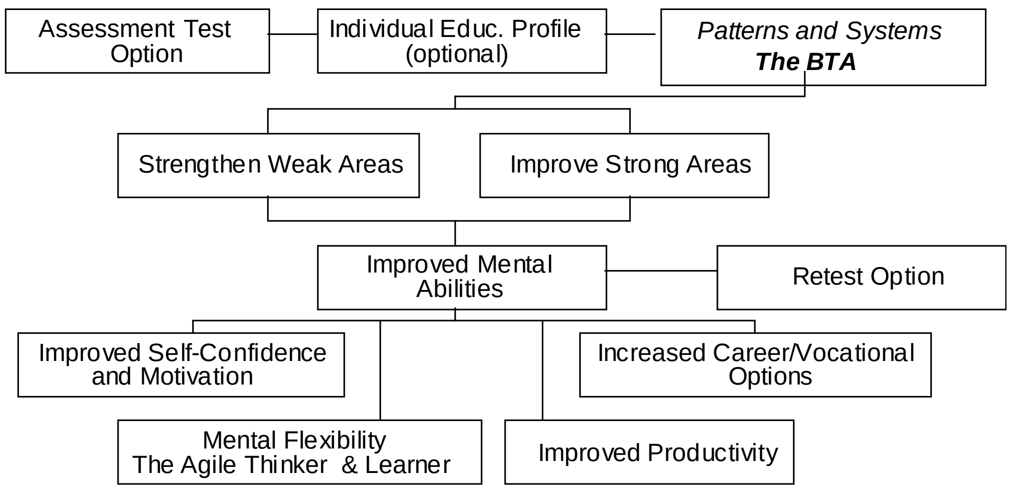
1990; Guilford, J. P., 1967). See J. Erland's 1980, 1989 Hierarchy of Thinking Model, Appendix

- Ability To Be "Quick On The Uptake" - The Agile Learner (Sternberg, R. J., 1992; Klahr, D. & Kotovsky, K., 1989; Simon, H. A., 1979).

- Mental Toughness (Sulzar-Azaroll, B., 1991; Green & Gallwey, 1986; Ruggiero, V. 1984).

The following chart demonstrates the testing procedure and how the training implementation corrects weak learning styles and strengthens strong visual and auditory learning styles by improving visual and listening memories for better conceptualization so all learners benefit.

The BTA Integrated Learning Plan



Designed for Schools, Businesses, Industry, and Private-Small Groups

8-Week, 12-Day, or 10-Day Plans Available for Ages 10-Adult

The Relationship between Learning Abilities, Theory, and Application for Outcome Effect

EDUCATIONAL THEORETICAL DISCIPLINES ☑

The Mental Foundation Requirements ☑

Baddeley, A. D., (1993); Kamhi & Catts (1989); Kirk & Chalfant (1984); Reid & Heresko, (1981); Meeker (1991,1969), Guilford, J. P. (1967).

Key cognitive areas:

Visual Sequential Memory
Auditory Sequential Memory
Visual and Auditory Closure for Details
Symbolic and Figural Content
Auditory and Visual Memory for Words
Classifying Information
Encoding and Decoding Information
Spatial and Directionality Skills
Verbal Comprehension and Relations
Immediate Recall that Transfers Info
Short and Long Term Memory
Auditory / Visual Integration
Auditory / Vocal Input Modes
Perceptual Motor Control
Grammatical Closure
Auditory Figure Ground
Visual Figure Ground
Notational Processes

+

Instructional Content ☑

The media components include sequenced instruction from the following areas:

Sight words and Reading comprehension (Deschant, E. V. 1991; Cairney, T., 1990; Kamhi, A. G. & Catts, H. W., 1989; Just, M & Carpenter, P. A., 1987; Rumelhart, D. E., & McClelland, J. 1986)
Spelling words and non-related letter sequences (Rumelhart D. E., & McClelland, J. L., 1986)
Vocabulary and Latin root words (Gardner, H., 1991; Sternberg, R. J., 1985; Devine, T. G., 1982)
Math computation (Gardner, H. 1991; Sternberg, R. J., 1985; Kline, M., 1985)
Grammar and syntax (Kess, J. F., 1992; Kamhi & Catts, 1989; Goodman, K. 1987)
Numerical digit spans (Kline, M., 1985; Hessler, 1982; Woodcock, 1978)
Following oral directions (Simpson, G. B., 1991; Hammill, 1985; Erway, E. A., 1984; Devine, T. E., 1982)
Following figural sequences (Jackendoff, R. S., 1992; Meeker, 1991; 1969; Woodcock, 1978)
Spatial and directionality skills (Meeker, M., 1991, 1969; Margolis, H. 1987; Hessler, 1982)
Poetry repetition, listening training (Gardner, H. 1993; Meeker, M. 1991, 1969; Hammill, 1985)

Multi-Media Accelerated Learning Training ☑

↓

Increased Academic Achievement and Career Enhancement

Acknowledgments:

To Donald H. Schuster, Ph.D. (d. 2002) Psychology Professor Emeritus, Iowa State University, Founder and first Editor of the Journal of Accelerated Learning and Teaching, for his mentoring, and dedication in perpetuating the works accelerated learning, and those of his mentor and University of Southern California advisor, the late J. P. Guilford, Ph.D. whose prominent "Guilford Intelligence Model" is the basis for this work. Special appreciation is expressed to Professor Schuster for his advising, advanced qualitative and quantitative analysis, and technical quality assurance in the earlier published works.

To Dr. Nancy Omaha-Boy, Ph.D. Professor (ret.), Rutgers University's School of Educational Excellence, Executive Editor for the Journal of Accelerated Learning and Teaching, for her insight and supervision of this important project, and for publishing the final four sets of juried research that won the 2001 International Alliance for Learning (IAL) innovative research award.

To Dick B. Tracy, Ph.D. Associate Professor (ret.), University of Kansas, Educational Psychology and Research, for his scholarly work on the statistical quantitative analyses and evaluations for Generations One to Three experiments.

To Lyelle Palmer, Ph.D. Associate Professor, School of Special Education, Winona State University, MN, for his continuing support and final data analyses of the five generations of Accelerated Learning published pedagogy.

To Virginia Eicholtz, Ph.D. Scientific Editor, (ret.) Menninger's Clinic, Topeka, Kansas, for her initial scientific insight and editorial review of my first published article in 1989.

To Edward Drahozal, Ph.D. Vice President (ret.), Iowa Test of Basic Skills (ITBS) Testing Service, Riverside Publishing Company, Ithaca, Illinois for his advice, editing, and technical support during the time of the 1998-2000 publications of the four reports of Generation Four.

To David Frisbie, Ph.D. Editor of the Iowa Test of Basic Skills (ITBS) Testing Service, Iowa City, Iowa for his technical support for the ITBS data analyses, Generations Four and Five.
To Craig Pattee, President of Dutko Worldwide government relations firm, Washington, DC, who offered valuable program evaluation advice in 1997 and in 2007 which bridged Generations Three, Four, and Five.

To Christina Erland Culver, M.S. founder of C/H global strategic consulting. former Vice President of Dutko Worldwide government relations firm, former Deputy Assistant Secretary of the US Department of Education, Washington, DC and former Vice President Strategic Planning, of the Children's Educational Opportunity Foundation, Washington, DC for her support throughout this extensive research project, and commitment to enriching the lives of children and adults.

To Martina Musteen, Ph.D. Associate Professor, College of Business Administration, San Diego State University, San Diego, California, for her continued advising in generation five, for her personal commitment, encouragement for innovation, effectiveness, and positive change in the educational reform field.

To Susan Grant, Ph.D. Learning Disabilities Consultant, Baltimore, Maryland, for her evaluation of my earlier works and recommendations stressing longitudinal summative findings, which were further addressed in Generations Four and Five.

To Chris Grant, Market Advisor, of Grant-Strudwick, Baltimore, Maryland, former board member of the Maryland State Board of Education, for his continuing advice and support for this project in its final Generational stages, interest in progressive education and the betterment of classroom instruction.

To Rod Miller, University of Kansas Business School student, Mem-ExSpan Administrative Assistant and project intern 1991-1993 for his data entry, analyses, evaluations, and table design, and re-formatting of the Bridge to Achievement program for Generations Three to Four.

To Kasha Kelley, State Representative of Kansas, former University of Kansas student and Mem-ExSpan Administrative Assistant and intern 1989-1992, for her dedicated copy editing and textbook formatting for Generation Three.

To Chris Burris, psychology Ph. D. doctoral student, 1990-1994, University of Kansas, for his statistical analyses and his recommendation for using an Alternate Media Activity for control groups in Generation Three experiments for schools three and four.

To Thomas Jud Stanion, University of Kansas Economics Graduate Student, Mem-ExSpan Administrative Assistant and volunteer, accountant, technical editor and analyst, his work with the data compilation, contextual qualitative and quantitative analysis, table methodology and progression, technical editing, and quality assurance for Generation Four.

To Stefani K. Janssen, University of Kansas Accounting and Pre-Law Student, Mem-ExSpan staff assistant and volunteer, accountant, and technical editor; her work with the data compilation, technical editing, presentation design, table formatting, and quality assurance for Generation Four.

To Nellya V. Tolkacheva, Ph.D. Biological sciences, Professor Chief of the Biochemistry department (ret.), Simferopol State University, Ukraine, former USSR, for her continued support, enthusiasm, and insistence that this work be published and perpetuated to help more people in the global marketplace.