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406 Penn St.
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**Brain-Based Learning Longitudinal Study Reveals
Solid Academic Achievement Maintenance
With Accelerated Learning Practice**

by Jan Kuyper-Erland

ABSTRACT

This report is a longitudinal follow-up study of the JALT article, (Erland, 1998) "Cognitive Skills and Accelerated Learning Memory Training Using Interactive Media Improves Academic Performance in Reading and Math."

This pre-post combined experimental and quasi-experimental study was to determine if the effects of former successful applications of Accelerated Learning, (AL), memory, and cognitive skills interactive media training could be replicated in multiple classrooms (Erland, 1994, 1992, 1989a, 1989b). Earlier quasi-experimental 12-week studies with fifth-grade public school classes revealed gains on cognitive skills tests transferring to high gains in reading and math that lasted longitudinally (Erland, 1994, 1992). This 10-week experimental application (40 minutes daily, Mon-Fri) of training sequencing-logic skills and pattern-finding through Accelerated Learning methods is called The Bridge To Achievement (The BTA). This Brain-Based learning application is designed to serve as a supplemental enhancement curriculum for all practiced academic instruction.

The study expanded on practical applications of Erland's Hierarchy of Thinking Model (1989c), Lozanov's Suggestopedia-Accelerated Learning (AL) (1978), and Guilford's Structure of Intellect (1986, 1967). Weak cognitive skill and memory areas improved through prescriptive mental rehearsal exercise. Strong mental areas were further advanced to higher levels.

Therefore, students were trained to strengthen their visual, auditory, tactile, and kinesthetic modalities and learn successfully through several primary styles rather than being limited to only a few modalities or styles. This approach also documents that learning dysfunction, such as Attention Deficit Disorder, or ADHD, can be remediated through prescriptive teaching. Even Gifted and Talented individuals can have defective cognitive skill and memory areas which can be improved (Erland, 1995, 1989a; Meeker, 1991, 1967; Guilford, 1986).

This study demonstrated the strength and viability of Accelerated Learning practice as shown by the dimensions of implementation adherence. Even the most incomplete BTA-AL implementation integrity applications evidenced achievement test gains.

Two Midwestern parochial schools comprised this study: School 1 and School 2. School

1, with 97 students in intact year-to-year grades 4-8, formed the quasi-experimental study. School 2, with 172 students in grades 4-7, participated in the experimental study. These combined groups totaled 269 students from fourteen classrooms. Both schools had track-records of high student achievement taught by proficient teachers. The minority population for School 1 was 17%, and for School 2, 8%. Neither school had Special Needs students identified, although some low performing students received tutoring outside the classroom with trained professionals.

Both schools had control groups: School 1 had a fourth grade classroom of 23 students who received no treatment. School 2 had a fifth grade class of 26 students, and a sixth grade class of 22 students. The three classes from two schools combined 71 controls. The 5th and 6th grade control groups received an equally prescribed content and time treatment with an Alternate Media Activity (AMA) that included elements from nineteen commercially popular media and print products. Student progress and achievement were measured by continuous classroom benchmarking and by the nationally standardized achievement test, The Iowa Tests of Basic Skills (ITBS), given annually, pre- and post-treatment. Standardized cognitive skill measures were also administered and cross-analyzed. Paired samples t-test statistics of standard score differences (DSSs) of the means on the ITBS were analyzed to compare experimental BTA gains with National Norms and AMA control group gains.

The eleven experimental classrooms had 65 academic subjects that were statistically significant more than the controls and norms combined. The experimentals showed marked strengths in 90 academic subject areas that either matched the high performing controls' results, or were statistically significant over both the norms and controls. The experimentals had 23 academic subject areas that were statistically significant over the controls in reading, math, language, spelling, science, and social science.

Longitudinal ITBS data support the conclusion that BTA/AL training effects remained constant and continued to build in all academic areas, particularly in reading and math. The remaining eight experimental classrooms' tests were statistically significant over the controls in 58 academic subjects; with 30 of them in reading and math. By contrast, the control groups had two statistically significant academic subjects on the ITBS. Further analyses revealed achievement gains measuring an additional +1 1/2 to 2 1/2 years' gain beyond the +1 to 1 1/2 year gains the schools typically received when the students had completed eighth grade.

The two lower cognitive skills fourth grade classes from School 2 that fell below the National Norms in DSS point gain in academic achievement immediately following BTA/AL treatment, nonetheless, evidenced high cognitive skill growth measured by the ITBS CogAT. Subsequently, the following year, these two classes had longitudinal ITBS academic achievement gains that brought them up to their peers. Their DSS scores were fifteen to twenty points above the National Norm expectations in all academic areas when they entered the 6th grade.

This study shows that with cognitive skills malleable and correctable, with all learning pathways treated to become operational, individuals do not have to settle for the limitations of nature and nurture. Moreover, Accelerated Learning, when applied prescriptively, offers the necessary bridge for the permanent maintenance of these results.

This strong evidence of longitudinal maintenance of BTA/AL treatment through media learning applications verifies that all levels of learners can access the opportunity for improved information processing leading to higher academic achievement. Further application of Accelerated Learning media training is recommended for multi populations, ages, and in a variety of settings.

The preceding JALT article (Erland, 1998), "Cognitive Skills and Accelerated Learning Memory Training Using Interactive Media Improves Academic Performance In Reading and Math," demonstrated how eleven experimental classrooms, compared to three control groups from two Midwestern parochial schools, obtained statistically significant gains in all academic achievement areas, measured by the nationally standardized The Iowa Tests of Basic Skills, (ITBS). This included Reading, Math, Spelling, Social Studies, Science, and Language Arts.

Each school had its own experimental design: School 1 was a Quasi-Experimental design, as they had intact classrooms, grades 4-8, and one non-treatment control/comparison group. School 2 was an Experimental Design with 5th and 6th grades control groups that received an Alternate Media Activity (AMA) for ten weeks. The experimentals (Es) were matched with ten weeks of similar instruction using The Bridge To Achievement (The BTA), non-commercialized, cognitive skills inter-active media program, but applied with Accelerated Learning (AL) techniques.

A four-tiered resultant outcome effect was analyzed according to how well the eleven experimental BTA classrooms applied the nineteen BTA executive criteria measures when coupled with daily classroom instruction. The top three classes that followed the applications correctly had an 82% success rate.

This study revealed a gradient range of significant results commencing with one classroom that followed the executive criterion at a 98% rate, experiencing statistically significant gains over the control group in fifteen out of the total sixteen ITBS academic subject areas. The executive criteria measures required ten weeks' of daily BTA/AL or AMA treatment for thirty to forty minutes.

Unfortunately, to expedite the training, some experimental classrooms cut training days, and either shortened, doubled-up, or eliminated BTA lessons and Accelerated Learning techniques, directly affecting their outcome results, and giving a circumstantial edge to the control groups.

Nevertheless, the experimental groups, who correctly applied the BTA nineteen executive criteria, had a high success rate over the control groups. The BTA treatment groups had gains equal to or greater than the robust scoring controls in ninety academic subject areas, with significant gains over both the controls and norms in sixty-five. The experimental scores were statistically significant over the controls in twenty-three academic subject areas.

The ITBS academic subjects that were most directly affected by low compliance of BTA/AL policy were the Reading, Math, and Science subtests. Therefore, these classrooms subsequently suffered lower scores in these integral achievement areas. Due to altered BTA/AL application, these students also achieved lower auditory memory gains (Erland, 1998). Reading, Math and Science require sufficiently functioning cognitive skills, which include good auditory

and visual memory integration needed for conceptualization (Meeker, 1991; Erland, 1989c; Reid and Hresko, 1981; Woodcock 1978).

The BTA cognitive skills training, accompanied by Accelerated Learning techniques, is designed to make all primary learning pathways (visual, auditory, tactile, kinesthetic) operational. Additionally, the strengthening and lengthening of the memory spans (both auditory and visual) creates the agile learner by The Hierarchy of Thinking model (Erland, 1998, 1994, 1989c). The long, strong visual and auditory memory spans develop mental resiliency for learning efficiency through encoding-decoding practice (Erland, 1998, 1995, 1994, 1992, 1989a, and 1989b). This BTA/AL training in pattern-detection and sequencing skill move beyond learning facts through mere rote memory drill (Erland, 1998, 1995, 1994, 1992, 1989a). This methodology is a type of “Brain-Based Learning.”

Longitudinal Results

First year subsequent longitudinal data became available from both schools, with additional second year longitudinal data submitted from School 1. Subsequent data for grade 8 of both schools were not available as students transferred to various high schools within the city.

This report answers several longitudinal maintenance questions regarding the robust gains for both the experimental and control groups from Schools 1 and 2 (Erland, 1998):

Were the longitudinal scores maintained statistically by both the experimentals (Es) and controls (Cs)? Did one group exceed the scores of the other, and if so, to what extent were they statistically significant, and in which academic subject areas? Did the two Alternate Media Activity (AMA) Groups have similar growth continuance, or was one control class score higher than the other? How did the scores of the fourth grade, conventionally taught, comparison - control group score longitudinally?

Did the high ITBS achievement scores obtained by grades four and six (4E3 and 6E3) from School 1, because they had followed BTA policy, maintain longitudinally, and if so, in which academic subjects? How did these longitudinal BTA/AL treatment scores compare to School 1's former classes of non-BTA/AL years?

How did the longitudinal two-year scores for 4E3, ensuing in grade 7, and 6E3 reaching grade 8, compare proportionately to the immediate post BTA/AL treatment standard scores of the other experimental classes?

Interestingly, School 1 had a high scoring gifted class since early primary grades. How did the BTA/AL of the high scoring 4E3 and 6E3 classes compare to this gifted class longitudinally and parametrically? In which subject areas was there a difference?

Finally, what was the longitudinal outcome of the two lagging, low auditory processing ability fourth grades (4E1 and 4E2) from School 2? Since third grade ITBS testing, these two classes hovered near, or slightly below, the National Norm (NN) expectations. Did they eventually improve?

Immediately following the BTA/AL treatment, these two classes had high cognitive skill growth as measured by the standardized ITBS-CogAT, and also by the DTLA-2 and WDJ-1 Psycho-Educational Battery. Yet, the two classes' Standard Score (DSS) Difference points still fell below the National Norm (NN) growth expectations.

Did this cognitive skill growth eventually translate to higher achievement longitudinal scores the following year? If so, to what extent was the growth, and in which academic subjects?

Longitudinal Results for School 1's 4E3, 5E3, and 6E3 Classes

Tables 1, 2, and 3 show the pre- post- longitudinal change as measured and derived from the ITBS standard scores for each of the sixteen subtests.

The 4E3 "star" class, with 98% policy compliance, had five statistically significant 1-year longitudinal post gains: Composite, Core Total, Reading Vocabulary, Math Concepts, and Math Total. However, when this 4E3 class was pooled with the other two fourth grades, 4E1 and 4E2, all academic subtests, except Math Computation, were significant at the $< .01$ level.

The second highest scoring classroom, 6E3, with 77% policy compliance, had eleven statistically significant academic subjects longitudinally. Nine of these eleven subtests fell at just the $< .1$ level. (See Table 3)

Surprisingly, the low-compliance (30%-36%) 5E3, had all fifteen out of sixteen one-year longitudinal academic subtests significant, mostly at the $< .01$ level following sixth grade (See Table 2).

Two-School Longitudinal Comparison, (Ten Classrooms), of the Experimentals and Controls

Table 4 depicts a statistically significant comparison of the eight experimental classrooms with the 5th and 6th grade control groups from School 2. Of the original eleven experimental classes, three eighth grades had transferred on to various high schools within the city, leaving eight classrooms to complete the study.

Experimental One-Year Longitudinal Gains: The experimental classes revealed fifty-eight academic gains within the thirteen primary subject areas. The three Language Arts subtests, capitalization, punctuation, and usage, were used for evaluation only occasionally as appropriate for Intra-analysis (See Tables 1, 2, & 3). Thirty-seven academic subjects were at the $< .01$ level, twelve academic subjects scored at the $< .05$ level, and nine academic subjects were at the $< .1$ level.

Control Groups' One-Year Longitudinal Gains: In contrast, the 6th grade control group had just two statistically significant gains: Reading Comprehension and Math Problem Solving. These two gains made by the 6th grade controls was due to two unusually low DSS gain scores made by the 6E1 experimental class who missed over one week of instruction mid-program. This factor established 6E1s lower 50% - 53% compliance level, and thereby affected subsequent auditory memory and academic achievement (Erland, 1998). These two unusually low scores were Reading Comprehension, 1.52 DSS (NN = 7 DSS), and Problem-Solving, 3.05 DSS, (NN = 11 DSS).

Table 1. Average standard scores on Iowa Tests of Basic Skills (ITBS) for BTA experimental group for Grade 4 (4E3, N=14) on pre-test, post-test and 1-year longitudinal follow-up.

	<u>Compos.</u>	<u>Read. Vocab.</u>	<u>Reading Compreh.</u>	<u>Reading Tot.</u>	<u>Math. Concepts</u>	<u>Math Problems</u>
<u>Pretest</u>						
Ave.	202.57	202.50	208.71	205.57	205.43	207.00
S. D.	17.99	20.47	25.09	20.85	19.32	14.44
<u>Posttest</u>						
Ave.	229.43	223.14	236.86	230.07	221.93	235.93
S.D.	22.73	22.18	23.22	21.84	20.02	22.51
t:	3.47**	2.56*	3.08**	3.04**	2.22*	4.05**
<u>Follow-up</u>						
Ave.	246.07+	238.71*	241.93	240.36	243.07*	249.14
S.D.	25.46	15.12	17.05	15.59	29.70	24.15
t:	1.82†	2.13*	0.66	1.41	2.44*	1.50
	<u>Math Tot.</u>	<u>M. Comp.</u>	<u>Spelling</u>	<u>Capital.</u>	<u>Punctua.</u>	
<u>Pretest</u>						
Ave.	206.14	191.50	191.36	199.29	200.29	
S. D.	15.11	23.73	19.10	31.23	23.73	
<u>Posttest</u>						
Ave.	228.79	221.57	222.64	236.14	237.21	
S. D.	19.44	15.32	22.98	25.55	28.30	
t:	3.44**	3.98**	3.93**	3.42**	3.74**	
<u>Follow-up</u>						
Ave.	246.36+	223.14	237.07	250.14	252.00	
S. D.	25.67	20.82	32.76	41.88	35.39	
t:	2.04†	0.23	1.32	1.07	1.22	
	<u>Usage</u>	<u>Lang Tot.</u>	<u>CoreTot.</u>	<u>Soc. Stud.</u>	<u>Science</u>	
<u>Pretest</u>						
Ave.	215.07	201.50	204.29	202.29	192.64	
S. D.	32.87	24.17	18.81	19.72	27.59	
<u>Posttest</u>						
Ave.	246.00	235.43	231.50	221.86	231.50	
S. D.	26.94	20.21	18.45	28.70	38.30	
t:	2.72*	4.03**	3.87**	2.10*	3.08**	
<u>Follow-up</u>						
Ave.	255.79	248.71	245.07+	238.93	248.86	
S. D.	36.04	29.32	20.24	33.43	35.51	
t:	0.81	1.37	1.82†	1.42	1.22	

Significance levels: * p < .05, ** p < .01, † p < .1

Table 2. Average standard scores on Iowa Tests of Basic Skills (ITBS) for BTA experimental group (N=25) for Grade 5 (5E3) on pre-test, post-test and 1-year follow-up with Student's t values for significant gains.

	<u>Compos.</u>	<u>Reading Vocab.</u>	<u>Reading Compre.</u>	<u>Reading Tot.</u>	<u>Math Concepts</u>	<u>Math Problems</u>
<u>Pretest</u>						
Ave.	218.56**	213.80	218.64	216.24**	214.24	227.16*
S. D.	18.09	20.50	25.40	21.64	19.23	26.23
<u>Posttest</u>						
Ave.	236.04	226.96	231.08	228.96	229.88	238.44
S.D.	19.59	18.69	21.85	19.27	19.77	25.13
t:	3.28**	2.37*	1.86†	2.19*	2.84**	1.55
<u>Follow-up</u>						
Ave.	256.82**	244.18**	252.23**	248.27**	256.00**	268.45**
S.D.	20.12	16.53	24.96	19.82	18.83	21.80
t:	3.70**	3.45**	3.16**	3.49**	4.78**	4.51**
	<u>Math Tot.</u>	<u>M. Comp.</u>	<u>Spelling</u>	<u>Capital.</u>	<u>Punctua.</u>	
<u>Pretest</u>						
Ave.	220.60**	210.64	212.00	225.28	229.12	
S. D.	20.77	19.91	26.95	32.10	32.10	
<u>Posttest</u>						
Ave.	234.20	226.64	231.04	237.44	244.92	
S. D.	20.90	17.75	34.88	41.43	36.28	
t:	2.31*	3.02**	2.16*	1.16	1.63	
<u>Follow-up</u>						
Ave.	262.32**	254.73**	259.86**	270.82**	270.64*	
S. D.	19.11	17.56	31.68	37.49	37.78	
t:	4.96**	5.63**	3.06**	2.99**	2.46*	
	<u>Usage</u>	<u>Lang.</u>	<u>Core Tot.</u>	<u>Soc. Stud.</u>	<u>Science</u>	
<u>Pretest</u>						
Ave.	230.76*	224.32**	220.32	209.80**	214.80	
S. D.	35.25	26.17	19.77	17.76	21.14	
<u>Posttest</u>						
Ave.	251.96	241.28	234.84	231.28	239.84	
S. D.	43.05	34.31	21.73	22.73	27.04	
t:	1.91†	1.97†	2.47*	3.72**	3.65**	
<u>Follow-up</u>						
Ave.	271.18	268.18**	259.59**	242.91	255.68	
S. D.	37.33	29.80	20.08	22.47	30.52	
t:	1.69	2.96**	4.18**	1.82†	1.94†	

Significance levels of t: *: $p < .05$, **: $p < .01$, †: $p < .1$

Table 3. Average standard scores on Iowa Tests of Basic Skills (ITBS) for BTA experimental group Grade 6 (6E3) pre-test (N=20, includes one outlier), post-test N=20, includes one outlier) and 1 year longitudinal follow-up (N=14) with Student's t values for significant gains.

<u>Test</u>	<u>Composit.</u>	<u>Read. Vocab.</u>	<u>Reading Compre.</u>	<u>Reading Total</u>	<u>Math Concepts</u>
<u>Pretest</u>	245.45	240.90	244.85	242.85	236.95
S. D.	18.80	19.56	21.50	16.27	19.67
<u>Posttest</u>	268.90	255.30	259.05	256.70	260.15
S. D.	20.83	16.70	32.54	23.13	23.96
t:	3.74**	2.50*	1.63	2.19*	3.35**
<u>Follow-up</u>	282.54	268.50	281.86	275.29	275.93
S. D.	21.31	23.59	30.37	24.71	18.50
t:	1.86†	1.91†	2.07†	2.24*	2.07†

	<u>Math Probs.</u>	<u>Tot. Math</u>	<u>M. Comput.</u>	<u>Spelling</u>	<u>Capital.</u>
<u>Pretest</u>	253.90	245.40	221.26	229.60	251.85
S. D.	28.47	22.29	14.29	25.95	38.63
<u>Posttest</u>	273.05	266.40	267.78	248.15	278.40
S. D.	25.42	22.27	20.02	32.77	37.93
t:	2.24*	2.98**	8.46**	1.98†	2.19*
<u>Follow-up</u>	289.50	282.71	280.86	267.57	289.00
S. D.	26.54	20.68	22.95	31.31	30.93
t:	1.82†	2.16*	1.77†	1.73†	0.86

	<u>Punctua.</u>	<u>Usage</u>	<u>Lang. Tot.</u>	<u>Core Tot.</u>	<u>Soc. Stud.</u>	<u>Science</u>
<u>Pretest</u>	255.20	249.45	246.55	244.90	238.60	247.75
S. D.	37.69	29.18	28.78	19.37	18.99	23.24
<u>Posttest</u>	285.90	275.90	272.20	265.30	270.30	277.90
S. D.	45.73	36.82	32.21	22.41	24.13	31.36
t:	2.32*	2.52*	2.66*	3.08**	4.62**	3.45**
<u>Follow-up</u>	290.21	298.36	286.14	281.36	280.00	288.79
S. D.	34.51	25.79	26.53	20.85	23.23	31.18
t:	0.30	1.97†	1.33	2.12†	1.17	1.00

Significance levels of t: * p < .05, ** p < .01, † p < .1

Table 4.

ITBS 1999 Longitudinal Academic Subject Comparisons of Experimental and Control Groups Gains
 Grades 4, 5, 6, & 7 Point Differences of Standard Score Means, (DSSs) Pre- to Post-test and One-Year Longitudinal
 Eight Experimental Groups (58 sig. academic gains) Comparisons with Two Control Groups (2 sig. gains) and ITBS National Norm Expectations

CLASS	Composite	Read Total	Vocab	Read Compr	Math Total	Math Concepts	Math Prob Solv	Math Computs	Lang Total	Spell	Core Total	Social Science	Science
	BIA - NN	BIA - NN	BIA - NN	BIA - NN	BIA - NN	BIA - NN	BIA - NN	BIA - NN	BIA - NN	BIA - NN	BIA - NN	BIA - NN	BIA - NN
4 th E3	26.86 - 10	24.50 - 9	20.64 - 8	28.14 - 9	22.64 - 12	16.93 - 12	28.93 - 11	30.07 - 14	33.92 - 13	31.28 - 13	27.21 - 11	19.57 - 9	38.86 - 9
5 th grade	16.64 - 7	16.29 - 8	15.87 - 8	20.07 - 8	17.57 - 14	21.29 - 11	13.57 - 10	1.57 - 13	33.29 - 10	14.43 - 10	13.57 - 10	17.07 - 8	17.36 - 7
N = 14	pooled	pooled	pooled	pooled	pooled	pooled	pooled	pooled	pooled	pooled	pooled	pooled	pooled
5 th E3	17.48 - 9	12.72 - 8	13.16 - 8	12.44 - 8	13.60 - 14	15.64 - 11	11.28 - 10	18.00 - 13	16.96 - 10	19.04 - 10	14.53 - 10	22.84 - 8	25.04 - 7
6 th grade	20.64 - 6	20.14 - 7	18.06 - 7	21.95 - 7	26.45 - 10	14.53 - 10	29.41 - 8	27.77 - 11	26.05 - 8	27.00 - 8	24.16 - 8	10.36 - 7	15.64 - 7
N = 25												pooled	pooled
6 th E3	23.84 - 8	15.00 - 7	13.10 - 7	17.84 - 7	21.78 - 10	23.26 - 10	20.68 - 8	46.47 - 11	25.57 - 8	18.36 - 8	21.05 - 8	31.31 - 7	32.47 - 7
7 th grade	12.67 - 4	19.61 - 7	16.23 - 7	20.62 - 8	14.23 - 8	10.23 - 9	17.77 - 7	11.62 - 10	11.85 - 8	13.67 - 8	14.77 - 8	8.69 - 7	7.46 - 8
N = 19													
4 th E1	13.89 - 16	10.62 - 14	10.92 - 15	9.83 - 14	16.84 - 15	20.37 - 15	11.62 - 15	9.16 - 18	15.41 - 16	15.70 - 17	13.70 - 15	7.91 - 15	22.79 - 16
5 th grade	23.77 - 11	23.36 - 13	16.86 - 14	30.05 - 13	19.82 - 14	16.33 - 14	23.09 - 13	22.50 - 15	30.50 - 14	18.50 - 15	24.91 - 14	24.45 - 14	18.10 - 14
N = 24	pooled	pooled	pooled	pooled	pooled	pooled	pooled	pooled	pooled	pooled	pooled	pooled	pooled
4 th E2	13.86 - 16	13.85 - 14	16.45 - 15	11.15 - 14	11.75 - 15	12.95 - 15	10.50 - 15	15.35 - 15	19.30 - 16	20.50 - 17	14.95 - 15	6.45 - 15	15.25 - 16
5 th grade	24.71 - 11	23.35 - 13	23.47 - 14	23.34 - 13	24.76 - 14	31.41 - 14	28.24 - 15	19.06 - 15	26.12 - 14	18.24 - 15	24.71 - 14	28.06 - 14	22.20 - 14
N = 20	pooled	pooled	pooled	pooled	pooled	pooled	pooled	pooled	pooled	pooled	pooled	pooled	pooled
5 th E1	21.72 - 16	17.16 - 13	13.72 - 14	20.48 - 13	23.04 - 14	18.72 - 14	27.48 - 15	33.12 - 15	35.64 - 14	23.04 - 15	25.28 - 14	18.28 - 14	16.60 - 14
6 th grade	16.88 - 9	10.72 - 12	8.04 - 12	13.56 - 10	16.24 - 13	15.12 - 13	17.80 - 12	12.28 - 13	16.08 - 12	7.52 - 12	14.36 - 12	22.68 - 11	22.04 - 11
N = 25				pooled							pooled	pooled	
6 th E1	17.04 - 14	16.04 - 12	16.28 - 12	15.71 - 10	25.90 - 13	21.66 - 13	30.14 - 12	21.09 - 13	27.38 - 12	20.95 - 12	23.14 - 12	6.71 - 11	17.14 - 11
7 th grade	12.90 - 7	3.43 - 12	5.52 - 11	1.52 - 10	7.71 - 11	12.33 - 11	3.05 - 11	19.19 - 12	13.19 - 11	12.14 - 10	8.09 - 11	23.52 - 10	11.52 - 10
N = 21													
7 th E3	11.00 - 7	7.64 - 7	7.68 - 7	7.80 - 8	7.76 - 8	4.12 - 9	11.24 - 8	10.28 - 10	9.17 - 8	15.76 - 7	8.16 - 8	10.36 - 7	14.36 - 7
8 th grade	10.36 - 4	9.73 - 6	10.64 - 6	8.36 - 7	15.68 - 7	22.91 - 9	8.45 - 6	16.73 - 9	13.50 - 6	7.14 - 8	12.95 - 7	5.72 - 7	2.32 - 11
N = 24													
5 th Contrl	19.30 - 16	19.03 - 13	19.69 - 14	19.03 - 13	23.65 - 14	23.23 - 14	23.80 - 15	23.42 - 15	28.38 - 14	21.92 - 15	23.69 - 14	8.26 - 14	25.76 - 14
6 th grade	16.83 - 9	8.42 - 12	9.00 - 12	7.58 - 10	13.92 - 13	11.67 - 13	16.63 - 12	16.67 - 13	17.46 - 12	11.58 - 12	13.25 - 12	26.33 - 11	12.42 - 11
N = 26													
6 th Contrl	17.81 - 14	15.27 - 12	14.86 - 12	15.13 - 10	16.45 - 13	14.68 - 13	18.72 - 12	25.13 - 13	26.90 - 12	23.40 - 12	19.54 - 12	15.68 - 11	22.81 - 11
7 th grade	15.63 - 7	15.16 - 12	9.68 - 11	20.68 - 10	16.26 - 11	14.79 - 11	17.37 - 11	12.84 - 12	7.89 - 11	1.95 - 10	13.11 - 11	19.58 - 10	15.26 - 10
N = 22													
# Sig. Gains	4-8	4-6	5-6	5-3	5-5	5-1	4-2	2-3	5-7	5-7	6-7	5-7	3-3

Note: Each figure of Standard Score Mean Pt. Differences (DSSs) is followed by the National ITBS Norm Expectations (NN) (ITBS Fall & Spring Tables). Under each figure is the Longitudinal Mean Pt. Difference (DSSs) and subsequent grade for comparison. Number of Sig. gains is in the final row, followed by the significant gains in original pre-post treatment. Significant gains are highlighted. ** < .01 (37 academic subjects) * < .05 (12 academic subjects) † < .1 (9 academic subjects)

The 5th grade control group did not have any statistically significant longitudinal gains.

Additionally, the 4th grade comparison groups' 1-year longitudinal data were analyzed from School 1. For longitudinal purposes, this classroom could not be considered a viable continuing control group, because the following year it entered a fifth grade, whose teacher had been trained in BTA/AL principles. Although this 5E3 teacher had not fully adopted nor fully applied the BTA/AL techniques, even some application of them would contaminate or skew the scores for longitudinal analysis.

Nevertheless, one-year longitudinal analysis was conducted for this fourth grade comparison group following their completion of the fifth grade. The scores ranged what was typical for School 1 and this teacher: the low was +11 points for Math Computation, (13 points National Norm (NN) DSS expectation) and a high +25 points for Math Concepts (11 points National Norm (NN) DSS expectation).

Averaging the fourth grade no-treatment, comparison groups' scores for the same nine primary ITBS subtests for their post-test to 1-year longitudinal, the DSS gains ranged: a low of +15 DSS points (1), +17 DSS points (3), three academic subtests ranged +20 to 23 DSS points, and a high of +27 DSS points for Language Arts. With the National Norm (NN) expectations for 4th and 5th grades ranging 9 to 15 DSS points, four of the primary subtests were above the norm expectations. This falls into accordance with School 1s' usual +1 1/2 to 2-year annual gains above the National Norms.

Since the 5E3 class had surprisingly high continuance for having inconsistent initial BTA/AL application, with minimal achievement gain, an Intra-analysis for trending of the 5E3 class was made. This analyses compared 5E3 to the 4E3 and 6E3 classes, and also with the National Norm (NN) growth expectations (See Tables 5, 6 and 7)

School 1's 4E3 class (98% - 98% compliance) (Table 5)

Comparing the 4E3s two-year longitudinal post scores to the NN expectations of 6th grade mean scores, in the nine primary ITBS Reading, Math, Language Total and Core Total subtests, the differences ranged +25-39 points. The lowest DSS change was in Math Computation +25 points; the highest DSS change was with Language Total +39 points (See Table 5).

Averaging the nine primary ITBS subtests, the average gain was +34 points over the National Norm (NN) expectations. With NN yearly growth expectations, +7 to 13 points for these subtests, this shows an additional two and one-half to three years' growth in these primary subject areas.

To compare 4E3 with the fourth grade comparison/control group pre to post-test, analyses revealed that 4E3s scores had higher ranges: a low of +9 points in Reading Total, +12 DSS points in Reading Comprehension and Math Computation, to a high of +14 DSS points in the Composite. This is an additional one years' achievement growth.

Two-years longitudinally, the 4E3 class excelled an additional one-year gain over this 4th comparison group, when the second application of Accelerated Learning was received.

School 1's 5E3 class (30% - 36% compliance) (See Table 6, Table 14 in Complete.doc)

The Two-year Longitudinal DSS gain, when compared to National Norm (NN) expectations, ranged from a low of +18 points in Reading Total, to a high +45 points in Math Computation. Averaging the nine primary ITBS subtests, and comparing with the NN, was +33 point difference. With the typical National Norms gain expectation +7 to 14 points for the various primary subtests, this is + 2 1/2 to 3 1/2 times over the NN expected gain, or an additional three years' longitudinal academic growth.

School 1's 6E3 class (73% - 77% compliance) (See Table 7, Table 15 in Complete.doc) revealed similar change. The Two-year Longitudinal Standard Score Differences (DSSs) (when reaching 8th grade) compared to NN expectations, ranged with two scores at +37 DSS points (Reading Total and Math Computation), to a high +52 DSS points in Math Problem-Solving. The average point gain, compared to the National Norms, for the nine primary subtests was +44 points. With the NN expectation for sixth grade, +7 to +14 points, this is +3 1/2 times the NN expected gain, or three to four years' longitudinal academic growth.

To further evaluate this +3 1/2 to 4 years' growth, the schools' typical yearly growth had to be extrapolated. Annual school trending was analyzed for School 1. This school not only had two-year's longitudinal data, and two successfully treated classes which followed the executive criteria measures 77%-98%, but they also furnished three years of pre-BTA/AL data. School 2's two-year longitudinal data will be submitted in the year 2000.

Averages for three pre- BTA/AL training years was computed for each of the nine ITBS primary subtests: Composite, Reading (2), Math (4), Language Total, and Core Total.

School 1's 1994-1999 Trending Record

Table 8 shows a comparison between the two successful 4E3 and 6E3 classrooms, with the three low-compliance 5E3, 7E3, and 8E3 classes, and with the National Standard Score (NSS) growth expectations. Two- and three- year averages were analyzed. The 4E3, 5E3, 6E3 classes' ITBS two-year longitudinal Standard Scores (SS) were then compared against the National DSS Expectations, and also with grades six, seven, and eight averages.

Interestingly, a gifted class went through School 1 with consistently high achievement scores each year. One analysis included a gifted class (three pre-BTA/AL years), and another analysis did not include this gifted class (two pre-BTA/AL years (See Table 8). The 1997 column's grade 7 score represents this gifted classes' immediate Post BTA/AL having low compliance BTA/AL treatment. This offered a good comparison with the other more typical performing classrooms for School 1.

The low-compliance, gifted 7E3 class (25% to 30% policy compliance) had six longitudinal statistically significant longitudinal gains in achievement compared to the National Norm Expectations. Of these gains, just two are beyond the typical growth pattern of meeting the National Norms, for the 8th grade teacher. This was a +23 DSS (post to one-year longitudinal) test point gain in Math Concepts, and +16 DSS points for Math Total (See Table 4).

Then, comparing the 7E3 BTA/AL post-test nine subject average of +21 points (See Table

Table 5.

Fourth Grade Class (4E3) Pre Test and ITBS Longitudinal Data, School 1
 Classroom with Complete 98% BTA Application during BTA initial treatment
 20% Multi-Ethnic, Special Needs Students Not Identified

Iowa Test of Basic Skills Subtests	Pre-tests		Post-tests		Point Diff. vs. Expected Gain
	M	SD	M	SD	Pt. Diff
COMPOSITE, 4th grade, (N=14)	202.57	17.99	229.43	22.72	26.86 - 7
One-year post longitudinal, 5 th grade	229.43	22.72	246.07	25.46	16.64 - 9
Two-year post longitudinal, 6 th gr. (N=13)	243.92	25.14	261.54	23.81	17.62 - 7
Nat'l Expected 6 th grade mean			229.56	29.98	20.37 Es Ave.
Reading Compre. 4th grade, (N=14)	208.71	25.09	236.86	23.22	28.14 - 9
One-year post longitudinal, 5 th grade	236.86	23.22	241.93	17.05	5.07 - 13
Two-year post longitudinal, 6 th grade	241.23	17.53	263.08	24.59	21.84 - 9
Nat'l Expected 6 th grade mean			227.27	35.34	18.88 Es Ave.
Total Reading, 4th grade, (N=14)	205.57	20.85	230.07	21.84	24.50 - 9
One-year post longitudinal, 5 th grade	230.07	21.84	240.36	15.59	10.29 - 13
Two-year post longitudinal, 6 th gr (N=13)	239.69	16.02	256.62	16.02	16.92 - 12
Nat'l Expected 6 th grade mean			226.98	29.88	17.24 Es Ave
Math Concepts, 4th grade, (N=14)	205.43	19.32	221.93	20.02	16.50 - 12
One-year post longitudinal, 5 th grade	221.93	20.02	243.21	29.90	21.29 - 14
Two-year post longitudinal, 6 th gr(N=13)	240.15	28.75	262.62	33.78	22.46 - 13
Nat'l Expected 6 th grade mean			227.58	28.47	20.08 Es Ave
Math Problem Solving, 4th gr. (N=14)	207.00	14.44	235.93	22.51	28.93 - 11
One-year post longitudinal, 5 th grade	235.93	22.51	249.50	23.89	13.57 - 15
Two-year post longitudinal, 6 th grade	248.54	24.59	266.54	32.20	18.00 - 12
Nat'l Expected 6 th grade mean			229.90	36.31	20.17 Es Ave
Total Math, 4th grade, (N=14)	206.14	15.10	228.79	19.44	22.64 - 12
One-year post longitudinal, 5 th grade	228.79	19.44	246.36	25.67	17.57 - 14
Two-year post longitudinal, 6 th grade	244.38	25.59	264.62	29.71	20.23 - 10
Nat'l Expected 6 th grade mean			228.74	30.80	20.15 Es Ave
Math Computation, 4th grade, (N=14)	191.50	23.73	221.93	15.32	30.07 - 13
One-year post longitudinal, 5 th grade	221.93	15.32	223.14	20.82	1.57 - 15
Two-year post longitudinal, 6 th grade	221.54	20.74	253.92	25.92	32.38 - 11
Nat'l Expected 6 th grade mean			228.44	28.34	21.34 Es Ave
Language Total, 4th grade, (N=14)	201.50	24.17	235.42	20.21	33.92 - 12
One-year post longitudinal, 5 th grade	235.42	20.21	248.71	29.32	13.29 - 14
Two-year post longitudinal, 6 th grade	245.85	28.40	269.08	24.97	23.23 - 8
Nat'l Expected 6 th grade mean			230.96	37.21	23.48 Es Ave
Core Literacy Total, 4th grade, (N=14)	204.29	18.81	231.50	18.45	27.21 - 11
One-year post longitudinal, 5 th grade	231.50	18.45	245.07	20.24	13.57 - 14
Two-year post longitudinal, 6 th grade	243.23	19.80	263.38	19.52	20.15 - 8
Nat'l Expected 6 th grade mean			228.89	29.98	20.31 Es Ave

Table 6.

Fifth Grade Class (5E3) Pre-Test and ITBS Longitudinal Data, School 1
 which followed the Executive Criteria 30-36% due diligence
 20% Multi-Ethnic, Special Needs Students Not Identified
Experimentals (N = 25)

	<u>Pre-test</u>		<u>Post-test</u>		<u>Point Diff. vs. Expected Gain</u>
<u>Iowa Test of Basic Skills Subtests</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>Pt. Diff</u>
COMPOSITE, 5th grade (N = 25)	218.56	18.09	236.04	19.59	17.48 - 9
One-year post longitudinal, 6 th gr (N=22)	236.18	20.24	256.82	20.12	20.64 - 6
Two-year post longitudinal, 7 th gr (N=22)	256.82	20.12	270.18	24.33	13.36 - 7
Nat'l Expected 7 th grade mean			240.89	32.59	17.16 Ave.
Reading Comprehension, 5th grade	218.64	25.40	231.08	21.85	12.44 - 13
One-year post longitudinal, 6 th gr (N=22)	230.27	21.92	252.23	24.96	21.95 - 7
Two-year post longitudinal, 7 th gr (N=22)	252.23	24.96	257.95	31.57	5.73 - 8
Nat'l Expected 7 th grade mean			238.42	38.59	13.37 Ave.
Total Reading, 5th grade, (N = 25)	218.24	21.64	228.96	21.64	12.72 - 13
One-year post longitudinal, 6 th gr (N=22)	228.14	19.72	248.27	19.82	20.14 - 7
Two-year post longitudinal, 7 th gr (N=22)	248.27	19.82	256.32	20.88	8.04 - 7
Nat'l Expected 7 th grade mean			238.25	31.88	13.63 Ave.
Math Concepts, 5th grade, (N = 25)	214.24	19.23	229.88	19.77	15.64 - 14
One-year post longitudinal, 6 th gr (N=22)	232.63	19.46	256.00	18.83	23.36 - 10
Two-year post longitudinal, 7 th gr (N=22)	256.00	18.83	275.18	17.49	19.18 - 9
Nat'l Expected 7 th grade mean			239.45	31.13	19.39 Ave.
Math Problem Solving, 5th grade	227.16	26.23	238.44	25.13	11.28 - 10
One-year post longitudinal, 6 th gr (N=22)	239.05	25.54	268.45	21.80	29.41 - 8
Two-year post longitudinal, 7 th gr (N=22)	268.45	21.80	281.68	30.04	13.23 - 8
Nat'l Expected 6 th grade mean			241.33	39.52	17.97 Ave.
Total Math, 5th grade, (N = 25)	220.60	20.77	234.20	19.27	13.60 - 14
One-year post longitudinal, 6 th gr (N=22)	235.86	21.24	262.31	19.11	26.45 - 10
Two-year post longitudinal, 7 th gr (N=22)	262.31	19.11	278.59	22.16	16.28 - 8
Nat'l Expected 7 th grade mean			240.46	31.27	18.78 Ave.
Math Computation, 5th grade, (N = 25)	210.64	19.66	226.64	17.75	16.00 - 13
One-year post longitudinal, 6 th gr (N=22)	226.95	18.54	254.73	17.56	27.77 - 11
Two-year post longitudinal, 7 th gr (N=22)	254.73	17.56	285.50	18.28	30.77 - 10
Nat'l Expected 7 th grade mean			240.60	33.48	24.85 Ave.
Language Total, 5th grade, (N = 25)	224.32	26.17	241.28	34.31	16.96 - 10
One-year post longitudinal, 6 th gr (N=22)	242.14	34.45	268.18	29.80	26.04 - 8
Two-year post longitudinal, 7 th gr (N=22)	268.18	29.80	278.50	33.40	10.32 - 8
Nat'l Expected 7 th grade mean			242.15	39.81	17.77 Ave.
Core Literacy Total, 5th grade, (N = 25)	220.32	19.77	234.84	21.73	14.52 - 10
One-year post longitudinal, 6 th gr (N=22)	235.45	22.18	259.58	20.08	24.14 - 8
Two-year post longitudinal, 7 th gr (N=22)	259.59	20.08	271.14	22.57	11.55 - 8
Nat'l Expected 7 th grade mean			240.26	32.24	16.77 Ave.

Table 7.

Sixth Grade Class (6E3) Pre-Test and Longitudinal Data, School 1
 which followed the Executive Criteria 73%-77% due diligence
 20% Multi-Ethnic, Special Needs Students Not Identified
Experimentals (N = 19; longitudinal N = 13)

	<u>Pre-test</u>		<u>Post-test</u>		<u>Point Diff. vs. Expected Gain</u>
Iowa Test of Basic Skills Subtests	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>Pt. Diff</u>
COMPOSITE, 6th grade, (N = 19)	247.47	16.92	271.31	18.29	23.84 - 8
One-year post longitudinal, 7 th gr. (N=13)	273.50	17.14	286.17	17.57	12.67 - 7
Two-year post longitudinal, 8 th gr. (N=13)	282.54	21.31	294.69	16.54	12.15 - 7
Nat'l Expected 8 th grade mean			250.87	34.56	16.22 Ave.
Reading Compre, 6th grade, (N = 19)	245.31	21.98	263.15	27.59	17.84 - 7
One-year post longitudinal, 7 th gr. (N=13)	265.77	23.79	286.38	26.24	20.62 - 8
Two-year post longitudinal, 8 th gr. (N=13)	279.23	29.91	293.69	29.17	14.46 - 7
Nat'l Expected 8 th grade mean			248.89	41.40	17.64 Ave.
Total Reading, 6th grade, (N = 19)	244.15	15.59	259.16	20.91	15.00 - 7
One-year post longitudinal, 7 th gr. (N=13)	259.54	17.86	278.77	21.84	19.23 - 7
Two-year post longitudinal, 8 th gr. (N=13)	274.00	25.22	285.62	26.29	11.62 - 6
Nat'l Expected 8 th grade mean			248.79	34.13	15.28 Ave.
Math Concepts, 6th grade, (N = 19)	239.47	18.55	262.73	21.55	23.26 - 10
One-year post longitudinal, 7 th gr. (N=13)	269.15	20.56	279.38	13.76	10.23 - 9
Two-year post longitudinal, 8 th gr. (N=13)	276.69	19.02	294.08	24.14	17.38 - 9
Nat'l Expected 8 th grade mean			250.44	33.53	16.96 Ave.
Math Problem Solving, 6th gr (N = 19)	255.21	28.61	275.89	22.60	20.68 - 8
One-year post longitudinal, 7 th gr. (N=13)	275.38	24.71	293.15	23.67	17.77 - 8
Two-year post longitudinal, 8 th gr. (N=13)	289.85	27.59	302.69	24.19	9.54 - 6
Nat'l Expected 8 th grade mean			250.94	42.31	16.00 Ave.
Total Math, 6th grade, (N = 19)	247.31	21.14	269.10	19.20	21.78 - 10
One-year post longitudinal, 7 th gr. (N=13)	272.07	20.75	286.31	16.35	14.23 - 8
Two-year post longitudinal, 8 th gr. (N=13)	283.23	21.43	298.54	23.28	15.31 - 7
Nat'l Expected 8 th grade mean			250.69	36.08	17.11 Ave.
Math Computation, 6th grade, (N = 19)	221.26	12.68	267.73	20.02	46.47 - 11
One-year post longitudinal, 7 th gr. (N=13)	272.54	13.84	284.15	20.15	11.62 - 10
Two-year post longitudinal, 8 th gr. (N=13)	283.08	22.72	287.77	20.83	4.69 - 9
Nat'l Expected 8 th grade mean			251.26	36.84	20.93 Ave.
Language Total, 6th grade, (N = 19)	249.52	26.21	275.10	30.28	25.57 - 8
One-year post longitudinal, 7 th gr. (N=13)	276.30	28.14	288.15	26.48	11.85 - 8
Two-year post longitudinal, 8 th gr. (N=13)	286.46	27.58	294.00	27.68	7.53 - 6
Nat'l Expected 8 th grade mean			251.69	41.57	14.98 Ave.
Core Literacy Total, 6th gr, (N = 19)	248.95	17.53	268.00	19.39	21.05 - 8
One-year post longitudinal, 7 th gr. (N=13)	269.62	17.41	284.38	18.21	16.38 - 8
Two-year post longitudinal, 8 th gr. (N=13)	281.23	21.69	292.54	21.52	11.31 - 7
Nat'l Expected 8 th grade mean			250.39	33.98	16.25 Ave.

Table 8.

School 1 Interclass Longitudinal DSS Comparison
 4E3 and 6E3 Classes with BTA-AL Compliance Compared to Other
 Three Low-Compliance (25-50%) Classrooms (5E3, 7E3, and 8E3)

	Bold Figures Are the Gifted Class Scores								Pre Average with Gifted	Post BTA	4th Grade Longitudinal	5th Grade Longitudinal	6th Grade Longitudinal	Nat'l
	Pre BTA	Pre BTA	Pre BTA	Pre BTA	Pre BTA	Pre BTA	Pre Average w/o Gifted	Class						
Year	1994	1995	1996	1997	1998	1999	Class	Class	1997	98-'99	98-'99	98-'99	98-'99	Expectat.
ITBS Subtest														
Composite														
grade 3	196.50	197.90	202.57	202.57	198.99									186.25
grade 4	232.80	224.00	218.56	218.56	221.28			225.12	229.43					202.72
grade 5	229.50	252.10	247.47	247.47	238.49			243.02	236.04	246.07				216.74
grade 6	253.80	248.00	273.76	273.76	250.90			258.52	271.31	261.54	256.82			229.56
grade 7	272.90	263.40	256.92	256.92	264.41				284.76	270.18	286.17			240.89
grade 8	276.50	287.60	279.2	279.2	281.10				271.35		294.69			250.87
Reading Compre														
grade 3	193.10	198.10	208.71	208.71	199.97									187.75
grade 4	239.60	229.60	218.64	218.64	224.12			229.28	236.86					202.59
grade 5	226.20	257.70	245.31	245.31	235.76			243.07	236.04	241.93				215.52
grade 6	250.60	241.80	272.96	272.96	246.20			255.12	263.15	263.08	256.82			227.27
grade 7	266.60	259.60	254.57	254.57	260.26				280.76		270.18	286.38		238.42
grade 8	270.80	281.40	269.50	269.50	273.90				270.14			293.69		248.89
Reading Total														
grade 3	195.00	199.40	205.57	205.57	199.99									188.35
grade 4	231.70	229.60	216.24	216.24	222.92			225.65	230.07					201.24
grade 5	224.20	249.40	244.15	244.15	234.18			239.25	228.96	240.36				214.76
grade 6	248.40	240.70	267.68	267.68	244.55			252.26	259.16	256.62	248.27			226.98
grade 7	263.60	256.50	253.14	253.14	257.75				275.32		256.32	278.77		238.42
grade 8	257.20	277.20	268.40	268.40	267.60				264.78			285.62		248.89

Table 8.

School 1 Interclass Longitudinal DSS Comparison
 4E3 and 6E3 Classes with BTA-ALCompliance Compared to Other
 Three Low-Compliance (25-50%) Classrooms (5E3, 7E3, and 8E3)

Bold Figures Are the Gifted Class Scores		Pre BTA		Pre BTA		Pre BTA		Pre Average		Pre Average		Post BTA		4th Grade		5th Grade		6th Grade		Nat'l		
	1994	1995	1996	w/o Gifted	with Gifted	1997	98-'99	98-'99	98-'99	98-'99	98-'99	98-'99	98-'99	98-'99	98-'99	98-'99	98-'99	98-'99	98-'99	SS	Expectat.	
Math Concepts	192.20	188.80	205.43	195.48																	185.2	
grade 3																						200.35
grade 4	227.80	215.10	214.24	214.67	219.05	221.93																214.61
grade 5	225.70	240.40	239.47	232.59	235.19	229.88	243.21															227.58
grade 6	250.50	247.00	267.84	248.75	255.11	262.73	262.62	256.00														239.45
grade 7	275.60	254.90	273.35	267.95		271.96																279.38
grade 8	286.00	289.50	277.40	284.30		259.71																250.44
Math Prob-Solv																						
grade 3	198.30	202.80	207.00	202.70																		186.57
grade 4	236.50	215.10	227.16	221.13	226.25	235.93																202.85
grade 5	239.10	256.80	255.21	247.16	250.37	238.44	249.50															216.89
grade 6	259.00	250.60	280.60	254.80	263.40	275.89	266.54	268.45														229.90
grade 7	279.60	262.30	264.64	268.85		291.84																241.33
grade 8	294.00	288.60	289.50	290.70		273.78																250.94
Math Total																						
grade 3	195.50	195.90	206.14	198.18																		185.89
grade 4	232.00	221.20	220.60	201.02	224.60	228.79																201.60
grade 5	232.60	248.70	247.31	239.96	242.87	234.20	246.36															215.75
grade 6	254.70	248.90	274.20	251.80	259.27	269.10	264.62	262.61														228.74
grade 7	277.60	258.60	262.35	266.18		281.96																240.46
grade 8	288.90	289.30	283.50	287.57		273.42																250.69

Table 8.

School 1 Interclass Longitudinal DSS Comparison
 4E3 and 6E3 Classes with BTA-ALCompliance Compared to Other
 Three Low-Compliance (25-50%) Classrooms (5E3, 7E3, and 8E3)

	Pre BTA				Pre Average with Gifted	Post BTA	4th Grade		5th Grade		6th Grade		Nat'l SS Expectat.
	1994	1995	1996	1997			Longitudinal 98-'99	Longitudinal 98-'99	Longitudinal 98-'99	Longitudinal 98-'99			
Bold Figures Are the Gifted Class Scores													
Math Computation													
grade 3	188.40	185.10	191.50	188.33								185.36	
grade 4	119.70	214.20	210.64	212.42	181.51	221.93						200.69	
grade 5	218.00	232.00	221.26	219.63	223.75	226.64	223.14					215.28	
grade 6	252.40	265.40	258.88	258.90	258.89	267.73	253.92	254.73				228.44	
grade 7	270.50	263.00	255.64	263.05		269.16		285.50	284.15	240.60			
grade 8	284.10	283.60	270.80	279.50		271.93			287.77	251.26			
Language Total													
grade 3	190.70	193.10	201.50	195.10								187.50	
grade 4	234.50	223.20	224.32	223.76	227.34	235.42						204.09	
grade 5	235.80	251.70	249.52	242.66	245.67	241.28	248.71					218.41	
grade 6	259.40	246.60	277.88	253.00	261.29	275.10	269.08	268.16				230.96	
grade 7	277.10	267.30	262.57	268.99		287.00		278.50	288.15	242.15			
grade 8	281.10	293.00	289.10	287.73		280.35			294.00	251.69			
Core Total													
grade 3	193.80	196.90	204.29	198.33								186.58	
grade 4	232.80	223.40	220.32	221.86	225.51	231.50						202.31	
grade 5	230.80	249.90	246.95	238.88	242.55	234.84	245.07					216.31	
grade 6	254.10	245.40	273.28	249.75	257.59	268.00	263.38	259.59				228.89	
grade 7	272.70	267.30	259.35	266.45		281.44		271.14	284.38	240.26			
grade 8	279.40	293.00	280.30	284.23		272.85			292.54	250.39			

9), over cumulative National Norm Expectations, the noticeable gains were in Math Total and Math Problem-Solving: (each, +24 points), Language Total (+28 points), and Core Total (+34 points).

However, the BTA/AL 6E3 classes' DSS scores at the same longitudinal 8th grade point ranges were: a low +14 (Language Arts), mid-scores of +24 (Reading Comprehension and Composite), and a high of +34 (Math Concepts) points higher than the gifted class (See Table 8. Compare post 8th BTA 1997 scores with 6E3 longitudinal '98-'99 data, and against the gifted classes' scores. The gifted class' figures are in bold).

Two years' previous pre-BTA/AL data was requested from the school. Unfortunately the 1991-1993 data was not ITBS Form K, but earlier Forms G and H, having dissimilar content, and also did not include NSS scores (Frisbie, D. Iowa Testing Service, 1999). Therefore, three years of School 1's former track-record was accepted for analyses.

Intra-Analyses of Table 8 Summary Chart of the 6E3 and 4E3 classes

Table 9 is an in-depth Intra-analysis of Table 8's comparison of School 1's previous track-record before the BTA/AL intervention.

6E3 experimental class compared to the gifted class.

The gifted classes' one-year longitudinal ITBS scores following the eighth grade, ranged: +10, 17, 21, 23, 24, 28 DSS points in Reading (two subtests), Math (four subtests), Composite, Language Total and Core Total, or nine primary ITBS subtests with an average of +21 DSS points over National Norm expectations.

By comparison, when the 6E3 class entered 8th grade two years later, the Standard Score (SS) growth was compared to the NN expectations and with the other eighth grade classes. (See Table 9.) The 6E3 classes' two-years' longitudinal DSS scores were: two lows of +37, and +42, 43, 44, (2) 45, 52, and 58, (average: +44 points) This is twice what the low compliance gifted class scored (+21 points) post-BTA/AL over the NN expectations offering +2 1/2 years' growth beyond what the school normally received.

Additionally, a comparison was analyzed between NN expectations for the eighth grade and the pre-BTA/AL grade eight's two-years' average without the gifted. These DSS points ranged +19, 25, 29, 30, 34 (2), 37 (2), 40 (average: +32 DSS points). Therefore, the 2-year longitudinal post BTA/AL 6E3-class had a +12-point gain beyond the average of the schools' track-record (+44 pts. versus +32 pts. or +12 points difference).

This is approximately an additional one-years' growth for the BTA/AL treated 6E3 class. This also includes the addition of another unusually high-scoring eighth grade class in 1995 that was averaged into the Pre-BTA/AL years that would lower the gains' DSS scores. (See Table 8.).

4E3 experimental class compared to the school's track-record without the gifted class.

Table 9.

Intra-Analysis of Table 8 Summary Chart.

Table 9 is a longitudinal comparison of the successfully BTA/AL treated 4E3 and 6E3 classes' ITBS Standard Score Point Differences (DSS) with the National Norm Expectations and the schools' former track-record averages.

Academic Subject (ITBS) Point Differences	Comp	Read Comp	Read Total	Math Concepts	Math Probs	Math Total	Math Comp	Lang. Total	Core Total	Ave. Gain
6E3 BTA/AL 2-yr 8 th Long. with Norms	44	45	37	44	52	48	37	42	43	44
Post 1997 Non-Compliant BTA/AL 8 th Gifted & Norm Expectations	21	21	17	10	24	24	21	28	34	21
Pre BTA/AL 8 th w/o Gifted Ave. & Norm Expectations	30	25	19	34	40	37	29	37	34	32

4E3 BTA/AL 2-yr 6 th Long. and Norm Expectations	32	36	30	35	37	36	26	38	34	34
Pre BTA/AL 6 th Ave. Including Gifted & Norm Expectations	29	28	25	27	33	30	31	30	29	29
Pre BTA/AL 6 th Ave. w/o Gifted & Norm Expectations	21	19	18	21	25	23	31	22	21	22

Shaded 8th and 6th grade classes = BTA/AL treated classrooms, longitudinal profile.

Now, to compare the 4E3 class' 2 year longitudinal scores with the school's 6th grade track-record that did not include the gifted class. The range was a low of +18 DSS points for Reading Total, and a high of +31 DSS points for Math Computation. (See Table 9) The nine primary ITBS academic subtests averaged +22 DSS.

So therefore, without the gifted class, the average was +22 points, and with the gifted class in sixth grade, the average was +29 additional DSS points, or seven extra points. Sixth grade norm DSS growth expectations range of +7 - 14 points. The BTA/AL treated 4E3 two-year longitudinal class, had +34 points, or +5 point gain (approximately one-half year's growth) over the gifted classes' average. They had +12 points average, or a full year over the no-treatment average that did not include the gifted class.

This is evaluating the averages for just the nine primary ITBS subtests. In many instances, the BTA/AL academic growth was +1 1/2 to 2 1/2 years beyond what the school routinely obtained in the ITBS academic subjects.

Additionally, in analyzing the two 4E3 and 6E3 classes longitudinally and comparing it to School 1's track-record average, it should be considered that the 4E3 and 6E3 longitudinal score compilation included the usual ensuing year's conventional teaching.

Projecting the 4E3s next two years beyond 6th grade with a conservative +9-10 point per year, or +18-20 points, the scores will range similarly or even beyond the 6E3s longitudinal averages. Reviewing Table 9, (Table 17 in Complete), adding +20 points to the +26 to 37 point scores would bring the scores into the high +40s to 50s ranges over National Norm (NN) growth expectations. One subtest, Math Computation, had a lower gain during the fifth grade year.

School 2's 4E1 and 4E2 One-Year Longitudinal Analyses

Table 10 compares School 2's 4E1 and 4E2 low auditory, low achievement classrooms' National Standard Score (NSS) gains, pre- post to 1-year longitudinal (4th to 5th to 6th grades) with other 6th grade classrooms and the DSS expectations.

The two classrooms' WDJ pre-test Visual Speed (subtests 2 & 7 baseline was 58% for 4E1, and 57% for 4E2. The WDJ Auditory Memory baseline (subtests 3 & 10) was 55% for the 4E1 classroom, and a lower 37% for the 4E2 classroom. In this researcher's previous article (Erland, 1998), both visual and auditory memory gains were noted. On the ITBS CogAT test, there was a substantial, yet unusual, gain in the Quantitative and Nonverbal subtests (Drahozal, Riverside Publishing Co. communication).

Table 10 reveals that these two lagging classrooms which fell below the NN (DSS) entering fifth grade, now have scores closely matching gains made by other sixth grade classrooms a year later. While the 4E1 class scores ranged slightly higher than the NN in ITBS achievement, the 4E2 classroom is +20-23 points higher in many of the ITBS academic subtests (NN Expectation for 6th grade is +7 - 14 points). These scores show that these two fourth grades had now

Table 10.

School 2s' 4E1 and 4E2 Low Auditory Memory Classes Pre BTA/AL Treatment and Post 1-Yr. Longitudinal NSS Comparisons
To Other 6th Grade Classes In That School and The National Norm Expectations

	Lang		Core Total	Social Studies	Science
	Usage / Exp	NSS			
3rd Gr. Pre 2 classes	179	176	179	187	184
4E1 Class					
4th Gr. Pre BTA/AL	194	194	197	201	199
5th Gr. Post BTA/AL	215	210	210	209	222
6th Gr. 1-Yr. Post BTA/AL	243	237	231	228	228
4E2 Class					
4th Gr. Pre BTA/AL	200	199	202	212	214
5th Gr. Post BTA/AL	227	218	217	218	229
6th Gr. 1-Yr. Post BTA/AL	245	242	239	243	255
Nat'l SS Fall Expecta					
3rd Gr. Pre BTA/AL	177	176	175	176	177
4th Gr. Pre BTA/AL	194	192	191	193	193
5th Gr. Post BTA/AL	209	208	207	209	209
6th Gr. 1-Yr. Post BTA/AL	223	223	221	223	223
5th Controls, AMA					
5th Gr. Pre AMA	214	210	212	223	219
6th Gr. Post AMA	238	239	237	229	245
6th Controls, AMA					
6th Gr. Pre AMA	236	236	235	239	240
6th 6E1-BTA/AL					
6th Gr. Pre BTA/AL	247	241	240	248	248

Table 10.
 School 2s' 4E1 and 4E2 Low Auditory Memory Classes Pre BTA/AL Treatment and Post 1-Yr. Longitudinal NSS Comparisons
 To Other 6th Grade Classes In That School and The National Norm Expectations

	Composite	Reading		Reading		Reading		Math		Math		Language		Capitalizati Puctuation
		Vocab	Compreh	Total	NSS	Concepts	Probs.	Total	NSS	Spelling				
3rd Gr. Pre 2 classes	182	182	183	183	183	175	180	178	172	174	176	173		
4E1 Class														
4th Gr. Pre BTA/AL	199	199	203	201	190	199	199	194	188	189	201	194		
5th Gr. Post BTA/AL	213	210	213	212	210	211	211	210	198	205	208	210		
6th Gr. 1-Yr. Post BTA/AL	230	220	237	229	222	230	226	219	222	239	245			
4E2 Class														
4th Gr. Pre BTA/AL	206	204	208	206	197	203	200	183	190	207	199			
5th Gr. Post BTA/AL	220	221	219	220	210	213	212	199	211	214	221			
6th Gr. 1-Yr. Post BTA/AL	243	243	241	242	228	238	233	221	228	247	249			
Nat'l SS Fall Expecta														
3rd Gr. Pre BTA/AL	176	175	177	176	173	175	174	171	174	175	177			
4th Gr. Pre BTA/AL	192	191	194	192	188	192	190	187	190	192	193			
5th Gr. Post BTA/AL	208	206	208	207	203	207	205	203	206	209	209			
6th Gr. 1-Yr. Post BTA/AL	222	220	220	220	217	221	219	217	221	223	223			
5th Controls, AMA														
5th Gr. Pre AMA	217	213	216	214	212	213	212	205	207	210	210			
6th Gr. Post AMA	237	232	235	234	235	239	237	229	229	244	246			
6th Controls, AMA														
6th Gr. Pre AMA	238	233	235	234	234	235	235	221	218	241	248			
6th 6E1-BTA/AL														
6th Gr. Pre BTA/AL	244	235	248	242	235	239	237	224	229	245	245			

caught up to their peers in academic achievement, particularly in reading and math, and were also higher than the National Norm expectations. Reading and Math Summary for 4E1 and 4E2:

Reading Total: 4E1, +9 pts above the National Norms, 4E2, +22 points above the National Norms. Math Total: 4E1, +7 points above the National Norms, 4E2, +14 points above the National Norms.

Discussion.

It was hypothesized that the BTA experimental treatment classrooms would have reading and math gains greater than the control groups' gains. The eleven Experimental classrooms had twenty-three academic subject gains statistically significant over the robust controls pre- to post-test: sixty-five were significant over the norms and controls combined. Longitudinally, the experimentals had fifty-eight statistically significant academic subjects over the two control groups. Thirty of these gains were in reading and math, thereby meeting the hypothesis.

The two schools typically obtained one to one and one-half years' growth yearly, dependent upon student and teacher variables. The BTA/AL training provided an additional +1 1/2 to 2 1/2 years' academic achievement growth beyond this, creating the three to four years' total gains as revealed by Tables 7, 8, and 9.

Earlier longitudinal studies (Erland, 1994, 1989b) reported that the previous BTA /AL robust three-year gains maintained, and continued to build in subsequent years. This study concludes that there can be as much as +three- to four-year gains in academic achievement. Extracting the schools' typical achievement record, this brings expectations down to +1 1/2 to 2 1/2 years' additional gain per year when accompanied with good classroom teaching.

It was fortuitous for the study that the strong application classrooms alternated with each of the misapplied classrooms, and that there was a continuing comparison with the gifted class. This created a contrasting effect, and exposed the treatment's working elements. With the alternate years of slower growth due to BTA/AL misapplication, it is a clear indicator that the BTA/AL cognitive skills eight- or ten-week treatment should be implemented again the following year for maximum effect and continuing growth.

This second treatment is advisable when cognitive skill pre-test measures reveal a class average of less than the 40th percentile rank in visual or auditory memory. Therefore, specific gains would not have to be extrapolated between school years, as gains would be more consistent. Lower achieving students would receive that important second session that has been shown valuable in earlier studies (Erland 1989a, 1989b).

If Accelerated Learning is applied continuously in consecutive semesters or years, consideration would also need to be made for learners with higher and lower capabilities, and should define school achievement goals for student and teacher leadership plans.

Additionally, video taping would serve as a tool for schools to duplicate the instruction successfully so their upcoming classes could continue to obtain similar positive results. Future studies should incorporate videotaping of the Accelerated Learning classroom instruction to aid

instructional evaluation and teaching. Videotapes become a valuable instructional index because they serve as a training reference for teachers, administrators, and evaluators.

Peer modeling proficiency (Bandura, 1997, 1986, 1971; Kaplan, 1991) with peer interaction is an important element and can be incorporated into DVD-ROM. Two or more paired students can work at a computer terminal and verbally reinforce each other with positive affirmations. Additionally, the students' attention and concentration is better with computerized interaction, as there is less distraction. Teachers also would have less micro-management responsibilities of behavior.

School administrators and teachers determine crucial learning style factors such as seating, room temperature, extraneous noise, and lighting (Dunn & Dunn, 1988, 1987). There will be tradeoffs, as ideal conditions are difficult to replicate across classrooms.

Good auditory memory (listening) is key to learning capability, and must integrate with visual memory for conceptualization to result. Guilford (1986, 1984, 1967), Meeker (1999, 1991, 1969), Reid and Hresko (1981) and Woodcock (1989, 1978, 1977). Auditory memory scores were noticeably affected in this study when BTA application was inconsistent (Erland, 1998).

Unfortunately, the classrooms having students with the lowest auditory memory scores, (4E1, 4E2, 5E3, 7E2, 8E3) had implementation shortcomings, which affected their students' ITBS outcomes. With minimal auditory memory improvement, the achievement gains were limited. Additionally, this study confirms that what gains they initially had, did not maintain longitudinally with high achievement results.

Although the 4E1 class applied most of the Accelerated Learning strategies, several critical encoding-decoding lessons were removed or taught incorrectly. Consequently, the 4E1 class made only a small two-point auditory memory gain (Erland, 1998), resulting in a more conservative DSS gain in Reading and Math over the National Norms.

The 4E2 class, although having slightly lower executive criteria implementation adherence than the 4E1 class, nevertheless consistently applied the Accelerated Learning strategies, cut fewer of the items and lessons, and implemented only one lesson incorrectly, thereby making a more significant five-point Auditory memory gain (Erland, 1998). This translated to higher DSS point gains in Reading and Math over the National Norms than the 4E1 class.

These two low auditory memory fourth grade classrooms from School 2, applied executive criteria BTA/AL policy just 63% to 68%. Nevertheless, they obtained substantial auditory memory gains on the DTLA-2, and ITBS CogAT. Subsequently, they evidenced statistically significant academic achievement results, pre- to post-test, when pooled with the high-scoring 4E3 class from School 1 (Erland, 1998).

Longitudinally, the 4E1 class had sixteen, or all, academic achievement areas statistically significant, and 4E2 had fifteen subjects (See Table 4). This sudden growth spurt had not occurred before, as these classes met, or hovered slightly below, the National Norms since their ITBS testing in third grade.

Yet, interestingly, these two fourth grade classes were the only School 2 classes that received cognitive skill growth on the CogAT in all three psychological domains of Verbal, Quantitative and Figural (Erland, 1998). It can be speculated that the properly implemented Accelerated Learning techniques, which increased cognitive skill and memory levels, may have created this effect.

As the ITBS-CogAT is designed to do, cognitive skills testing offers schools a blueprint for measuring student aptitudes, learning requirements and prescriptive brain-based instructional methods for teachers and students. Prescriptive measurement and evaluation of cognitive skills can also offer schools an efficient way to identify and train remedial students in the regular classroom.

The other low auditory memory classes (5E3, 7E2 and 8E3) with implementation shortcomings, eliminated Accelerated Learning (AL) components, and therefore made fewer academic achievement gains.

Surprisingly, the 5E3-class, although achieving fewer statistical gains with the BTA treatment (Social Science, $p < .05$), made strong gains in Science and Social Studies, and the class later had robust longitudinal gains (See Table 4). This is because of two factors: 1) a dedicated accelerated-learning (AL) trained teacher the following year reinforced incomplete application of the BTA during the treatment year. Although as sixth graders they did not have the BTA materials to use, these 5E3 students were reinforced with Accelerated Learning methodology accompanied with good instructional teaching. 2) cognitive skill growth does not always show immediate academic achievement test gain. Many times, the mental growth builds with subsequent practice, activates, and becomes evident with achievement score gains in ensuing years (Erland, 1998, 1994, 1989b; Meeker 1991).

The following year, when the 5E3 teacher subsequently took over the high-scoring 4E3-class, they continued to maintain its longitudinal gains. The teacher had applied some Accelerated Learning techniques, but had eliminated BTA protocol. Consequently, the 5E3 teacher retained the same pattern of obtaining the expected +6 to +20 DSS point gains. Although Accelerated Learning strategies will increase scores (Schuster and Gritton, 1986), the BTA media instruction serves as a performance catalyst, as it did with 4E1, 4E2, 4E3, 5E3, and 6E3 (See Table 6).

The proficient 6E3 teacher typically attained +11 to +20 pt- gains in standard scores (See Table 7; Table 15 in Complete.doc). For the 1996-year with the gifted students, the SS point gain ranged higher, +16 to +25 points. Yet, in the year of the BTA study without the gifted, this teacher's DSS point gains ranged from +15 to +46 points with an average of +44 points over the National Norm expectations two years following the BTA/AL treatment. Nonetheless, the formerly low-compliance 5E3 class with the low auditory memory scores now had gains due to the subsequent AL booster training.

The principal and Site Supervisor expressed puzzlement over the high performing seventh grade class that had a long, continuous record of high ITBS achievement test success (See Tables 7 and 12) since the early primary grades. They did not realize that this class had high

cognitive skills test scores as an aggregate group. It can be an anomaly not to have a few low cognitive skill-functioning students in a classroom.

However, even the brightest students can lose their peak performance edge when their classroom instruction lacks prescriptive instructional techniques. This study demonstrates that it is therefore possible for slower or lower cognitive level students receiving better instruction, to pass gifted students having average instruction. The lower- to-average cognitive skill students became retrained, and raised to higher learning ability levels. With the good AL instruction, they surpassed, or at the very least, matched the gifted 7E3 in ITBS DSS point gain (See Tables 8 and 9).

Consequently, the critical Accelerated Learning elements that become the catalysts for future instructional improvement, were revealed and documented by the irregular implementation factors. The executive criteria measures were prescriptively monitored and scored on classroom visitation criterion checklists (Erland, 1998). Additionally, a criterion referenced performance baseline was formed by the study. This growth index continues even when followed by teachers teaching with traditional, conventional methods (See Tables 7, 8 and 9).

Additionally, earlier studies (Erland, 1989a, 1989b) reported that The BTA/AL training had longitudinal maintenance gains by adult learners as well as with younger students.

In one published study (Erland, 1995, 1989a), a Multivariate Analysis of Covariance (MANCOVA) Using 7 Dependent Variables, revealed that the experimentals had evidenced the same amount of statistically significant cognitive skill and memory improvement for a wide range of ages (nine to adult), and ability levels (low to high).

For this study, the independent variables were group, age, and pace. Group: experimentals and controls. Age: two age groups, 10-15, versus 16 to adult. Pace: included two varying cognitive skill ability levels of low and high. There was a significant overall main effect for the experimentals, $F=26.55$, $p < .01$. There were no significant main effects for age and pace.

Accelerated Learning (AL) techniques and The Bridge To Achievement (The BTA) can offer consistent academic achievement results when taught prescriptively. Required lessons, items, and number of prescribed days should be instructed according to time and task, scope and sequence.

Furthermore, Accelerated Learning (AL) techniques should also be taught according to their author's original design (Lozanov, 1978; Schuster and Gritton, 1986). When AL methods are given piece-meal, abridged, or modified beyond recognition, solid, measurable, scientific gains become problematical.

Software applications into DVD-ROM would produce positive results because the electronic medium can effectively regulate systematic implementation of the nineteen executive criteria measures, many of them inherent to AL. Additionally, to eliminate performance problems due to teachers' varying acceptance of teaching additional curricula outside their in-place lesson plans, the instruction would be best automated. This automation would also support teachers'

home review of the prescriptive teaching strategies and understanding the theories and rationale behind the instruction.

Ideal for Long Distance Learning applications and laptop computer projections, for larger instructional groups, the teacher would not be eliminated from this specialized instruction. The automated instruction could be accompanied with warm, dynamic facilitator-student coaching interaction. Yet, this instruction could also be applied to computer stations, requiring less teacher supervision, with participants working in pairs, for independent learning success.

Conclusion.

With cognitive skills malleable and correctable, with all learning pathways treatable to become optimally operational, we do not have to settle for what basic nature and nurture, our environment, gives us for information processing capability.

Erland (1989a) discovered by clinically assessing over a thousand individuals in a wide range of ages, ability levels, and walks-of- life, everyone had areas of cognitive skills or memory levels that could be enhanced. Whether individuals are gifted, of average abilities, or remedial, (as with Attention Deficit Disorder, or ADHD) cognitive skills can be further developed to enable individuals to reach higher potentials. Average or low average performance no longer interfaces with the technological age.

Then, through almost two decades of test-teach-revise-test iterations, Erland (1998, 1994, 1989a, 1989b) determined that minds are renewable and retrainable through prescriptive exercise. Furthermore, if learning problems can be alleviated or eliminated, by application of a cognitive skill - AL methodology such as the one applied in this study, the training should be available for schools to assist all students with learning. Accelerated Learning offers the necessary bridge to achieving and maintaining high academic performance.

It can therefore be concluded that if students receive Accelerated Learning methodology in early grade school years, they can synergistically carry cognitive skill, memory, and academic achievement growth forward through their formative years into adulthood (Erland, 1995, 1989b).

Additionally, if adults can improve their learning proficiency through improved information processing capability, they can maintain a vital edge in the high performance workplace (Erland, 1999, 1997). The wide range of solid results for the BTA/AL experimental classes demonstrates the strength and viability of Accelerated Learning to open avenues for instruction in a variety of settings, ages, and with multiple populations.

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Jan Kuyper-Erland, M.S., is a Performance Analyst and Intervention Consultant for Mem-ExSpan, Inc.'s High Performance Thinking ® training, measurement, and evaluation. Jan can be reached at (785) 749-5402 email:memspan@idir.net

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