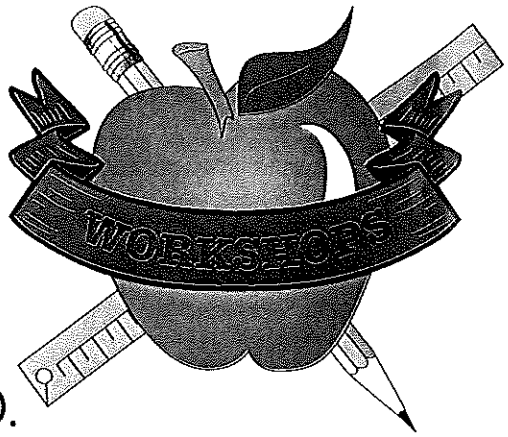

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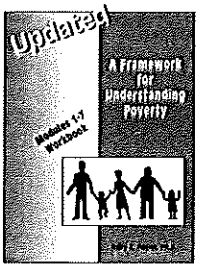

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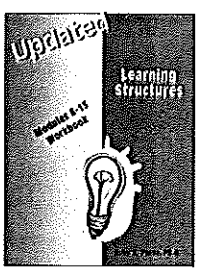

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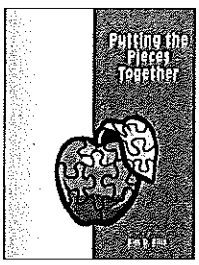

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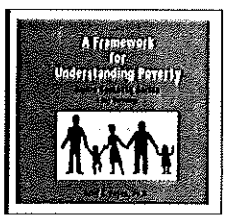

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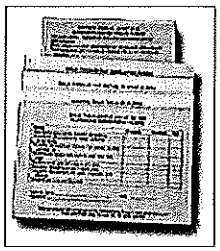

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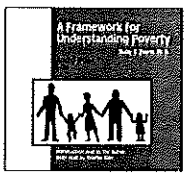

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Impact of Ruby Payne's *Instructional Framework* on Student Achievement in East Allen County Schools, Indiana 2001-03

For

aha! Process, Inc.
Highlands, Texas

Under Independent Contract
to

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May 18, 2004

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Impact of Ruby Payne's *Instructional Framework* on Student Achievement in East Allen County Schools, Indiana 2001-03

Executive Summary

Purpose

The purpose of this study was to analyze the impact of Dr. Ruby K. Payne's *Instructional Framework* (1995, 2001)—as the basis for the Learning Perspectives Initiative in East Allen County Schools—on student achievement.

Background/Context

The Learning Perspectives Initiative (LPI) was "a multi-year initiative designed to help educators in East Allen County Schools better understand and teach students from varying economic means. The initiative's goal was to improve the academic achievement of students from all economic backgrounds" (Novotny, 2003, p. 1). The Foellinger Foundation provided funding for four years for materials, training, and implementation in all schools of the East Allen County Schools.

The LPI was based on components of Dr. Ruby K. Payne's book *Poverty: A Framework for Understanding and Working with Students and Adults from Poverty* (1995), which in 1998 was renamed *A Framework for Understanding Poverty* (1998, 2001, 2003, 3rd Revised Edition). Cognitive strategies (mental models, planning to control impulsivity, plan and label for academic tasks, question making, sorting strategies that use patterns); systemic interventions (student performance targets for equity and excellence, time and content grid, benchmarks and rubrics, identifying when a student is in trouble and providing interventions, accountability measures using 10 common test questions, and embedding systems in building plans and school calendars); professional development; data collection and analysis; and building relationships. This was the only innovative program implemented in EACS during the period 1999-2002 consistent with the investment and requirements of the Foellinger Foundation.

Student Achievement Data Analyses

Determining the impact of the LPI and Ruby Payne's *Framework* (1995) on student achievement required the analysis of standardized assessment instrument data in multiple academic domains. The Indiana Department of Education required the use of the ISTEP+ (Indiana Statewide Testing for Educational Progress), which had two standardized academic measures—one norm-referenced and one criterion-referenced. First, the norm-referenced portion was composed of four summary scores—Total, Reading Composite, Language Composite, and Math Composite—expressed as Normal

Curve Equivalents (NCEs). Second, the Indiana Academic Standards (criterion-referenced portion of ISTEP+) reflected the percentage of students who met or exceeded the standards in Mathematics, English/Language Arts, and Both. Both sets of dependent variables were used in this study.

Determining the consistency of the implementation of any model (model fidelity) is crucial to determining its impact on student achievement. Novotny (2003) described 25 characteristics present in EACS during the multi-year implementation of the LPI that were consistent with the actions and culture required in the implementation of Payne's *Framework*. The presence of these factors provided strong support for the high-fidelity implementation of the model in EACS.

A time-series design (Campbell and Stanley, 1963) was used with seven cohorts of students over the six-year period. Two sets of dependent variables from the ISTEP+ were used—one norm-referenced and one criterion-referenced. A chi-square analysis was completed for each of the two sets of data comparing the student achievement differences (increases/equals/decreases) over years within and cohorts with the expected differences within and across cohorts based on a normal distribution.

For ISTEP+ norm-referenced student achievement data differences within and across cohorts on NCE mean scores for Reading Composite, Language Composite, and Mathematics Composite, the resulting statistic was X^2 (Goodness of Fit) = 11.66 ($p < .01$). Thus, there was a statistically significant difference between the observed and expected values with the increases being significantly higher than expected, the equals being significantly lower than expected, and the decreases being approximately equal to the expected. Students participating in LPI using Ruby Payne's *Framework* (1995) scored statistically significantly higher than would have been expected based on chance. Inspection of these results indicated the following:

- The range of differences for increases was +3.8 to +9.7 NCEs; the range of differences for decreases was -2.1 to -4.9 NCEs.
- 78% (14/18) of the differences in Mean NCEs across all three academic areas were increases (8/18) or equals (6/18).
- The greatest absolute increases were for the 10^{th} vs. 8^{th} grade comparisons for all three academic areas.
- The greatest number of decreases were for 8^{th} vs. 6^{th} grade comparisons in Language Composite and Mathematics Composite.
- There appears to be a cumulative effect on academic achievement over time for participation in the LPI using Ruby Payne's *Framework* (comparison of Cohort 2 with two years and Cohort 3 with three years of participation).
- The increases are practically significant in terms of size across all three academic areas.

For ISTEP+ criterion-referenced student achievement data differences within and across cohorts on percentage of students meeting or exceeding state standards for Mathematics, English/Language Arts, and Both, the resulting statistic was X^2 (Goodness

of Fit) = 45.11 ($p < .001$). Thus, there was a statistically significant difference between the observed and expected values, with the increases being significantly higher than expected, the equals being significantly lower than expected, and the decreases being approximately equal to the expected. Students participating in LPI using Ruby Payne's *Framework* (1995) scored statistically significantly higher than would have been expected based on chance.

Inspection of these results indicates the following:

- The range of differences for increases was +6% to +17%; the range of differences for decreases was -5% to -9%.
- 61% (20/33) of the comparisons indicated that students exceeded the prior year's percentage of meeting/exceeding standards across all three content areas.
- 45% (5/11) of the comparisons indicated that students exceeded the prior year's percentage of meeting/exceeding standards in the Mathematics area.
- 73% (8/11) of the comparisons indicated that students exceeded the prior year's percentage of meeting/exceeding standards in the English/Language Arts area.
- 64% (7/11) of the comparisons indicated that students exceeded the prior year's percentage of meeting/exceeding standards in Both areas.
- The 10^{th} vs. 6^{th} grade comparisons and the 10^{th} vs. 8^{th} grade comparisons had the most increases in all three areas.

These results are both statistically and practically significant and indicate that the LPI using the Payne *Framework* (1995) had significant impact on increasing student achievement as measured by both the norm-referenced and the criterion-referenced portion of the ISTEP+. Student participation in the LPI using Payne's *Framework* (1995) resulted in more increased student achievement than would have been expected by chance based on two dependent measures of student achievement.

Recommendations for Continued Investigation of Impact

Recommendations for continuing investigation include the following:

- Refine the cohorts to include only students who participated in the LPI for three or more years.
- Analyze EACS data in comparison with those from the state level and compare the results to a system that is similar in demographics that is not using Payne's *Framework* (1995).
- Analyze SAT/ACT scores and post-secondary participation to follow up data for longer-term impact.
- Analyze the differences in student achievement across disaggregations—sex, race/ethnicity, LEP, SES, and disabilities.
- Analyze attendance rates, dropout rates, and graduation rates—particularly for the high school—to ensure that the distribution of all students has not been truncated.

Purpose

The purpose of this study was to analyze the impact of Dr. Ruby K. Payne's *Framework* (1995) on student achievement in the East Allen County Schools (EACS) in northeastern Indiana. While Henry and Davies (2003) included assessments of the climate in the EACS schools and system as part of an interim assessment of the Learning Perspectives Initiative (LPI) from December 2002 through July 2003, no access to analyses of student achievement data was provided. The LPI was implemented based on materials and in-depth training provided by Ruby Payne and her associates from **aha!** Process, Inc. through funding from the Foellinger Foundation (Novotny, 2003). The current study focused on comparing student achievement data from 2001 through 2003 (during implementation) with comparison data from 1998 through 2000 (prior to implementation).

Background/Context

Henry and Davies (2003) described the East Allen County Schools in 2002-03 as a very large school district with an exceptionally diverse clientele (p. 4). While the distribution of males and females was fairly constant across schools, other distributions varied. SES, as measured by Free/Reduced-Price School Lunch, ranged from under 10% to over 70% with a median of about 25%. Ethnicity ranged from over 90% White to over 80% African-American, with small percentages of Native American, Asian, Hispanic, and Multi-Racial students. The percentage of students with disabilities ranged from 5% to 16%.

Novotny (2003) described the LPI in EACS as "a multi-year initiative designed to help educators in East Allen County Schools better understand and teach students of varying economic means. The initiative's goal was to improve the academic achievement of students from all economic backgrounds" (p. 1). The Learning Perspectives Initiative was based on Ruby Payne's *Framework* (1995), which provides theoretical perspectives and practical application to assist educators in understanding how children from varied economic backgrounds process information and deal with the hidden rules of class that govern individual behavior and impact student learning.

The EACS Board of Education committed to the following actions in 1999:

- Participate in the LPI through June 2003.
- Train all district staff in Ruby Payne's *Framework* (1995) through up to a maximum of four days per year for release time for professional development for classified and certified employees.
- The district and each individual school/site defined how progress would be measured.
- Systemwide academic achievement was measured by ISTEP+ scores, along with other measurements toward improving the success rate of students and increasing accountability for the district (Novotny, 2003, p. 2).

Learning Perspectives Initiative (LPI)—A Description

Novotny (2003) stated that the LPI, based on Payne's *Framework* (1995), was composed of the following six components:

- Cognitive Strategies
- Systemic Interventions
- Professional Development
- Data Collection and Analysis
- Building Relationships
- Special Projects

A brief description of each is provided below [Payne (1995) notation added to quote from Novotny (2003) as appropriate]:

Cognitive Strategies. Five cognitive strategies were in the LPI framework.

- *Mental models:* Translating the concrete to the abstract requires the mind to hold the information in a mental model—e.g., a two-dimensional visual representation, a story, a metaphor, or an analogy (Payne, 1995).
- *Planning to control impulsivity:* Student planning is the focus of this strategy—not teacher planning. Step sheets, planning backwards, and "plan, do, review" are examples of teaching impulse control to students (Payne, 1995).
- *Plan and label for academic tasks:* Numbering, lettering, arranging symbols, and color-coding are four ways to systematically label tasks. A systematic approach to the labeling usually means that fewer pieces of the task are skipped or missed (Payne, 1995).
- *Question making:* Formulating questions syntactically is important because without this ability the mind can't know what it knows (metacognition). Playing "Jeopardy!," making question cubes, doing reciprocal teaching, and creating multiple-choice questions are ways of developing these skills (Payne, 1995).
- *Sorting strategies that use patterns:* In order to receive and store information, one must be able to sort criteria. Teaching patterns shortens the time needed to teach various elements of the curriculum. Sorting M&Ms, using patterns, cartooning, and identifying criteria all are creative ways for teachers to use sorting techniques (Payne, 1995, and Novotny, 2003, pp. 3-4).

Systemic Interventions. Six systemic interventions were in the framework:

- *Student performance targets for equity and excellence:* Gridding an individual student's performance on specific tests can provide disaggregated information and student-by-student progress (Payne, 1995).

- *Time and content grid:* Having time and content identified for each subject/course gives direction and consistency to teachers across the district (Payne, 1995).
- *Benchmarks and rubrics:* Conducting benchmark assessments and using rubrics to provide consistent feedback and evaluation instruments (Payne, 1995).
- *Identifying when a student is in trouble and providing interventions:* The sooner a student in trouble is identified, the better chance he/she has of being successful in school. Early interventions are critical (Payne, 1995).
- *Accountability measures using 10 common test questions:* Developing and assessing 10 common test questions within a grade level's discipline provides information about student progress toward standards. It also provides teacher feedback about instruction (Payne, 1995).
- *Embedding systems in building plans and school calendars:* Success comes from building capacity into a system. By embedding systems, capacity is built and instructional monitoring occurs (Payne, 1995, and Novotny, 2003, p. 4).

Professional Development. Teachers and administrators participated in an ongoing program of professional development conducted by specially trained practitioners from **aha!** Process who visited schools on a regular basis. Classified personnel were provided training directly related to their job assignments. Ongoing technical assistance was provided by district personnel who had participated in the **aha!** Process Training of Trainers. They provided in-house expertise for long-term support through study groups, in-class modeling, coaching, and district in-service programs (Payne, 1995).

Data Collection and Analysis. Data were collected both formally and informally to monitor student progress. Specific measures included standardized tests, benchmark tests to quartile students, rubrics, and computer software programs. Data analysis was ongoing, using the student, classroom and building as the units of analysis (Payne, 1995).

Building Relationships. There were two parts to this intervention. First, understanding and using the hidden rules within varying economic levels were essential to building relationships and improving student achievement. Second, home contacts by school and district staff were conducted each fall. When possible, teachers conducted these contacts in the students' homes (Payne, 1995).

Special Projects. To respond to the diverse needs at each site, personnel at all sites implemented some type of special project—e.g., after-school program, tutoring assistance, etc. (Novotny, 2003, pp. 4-6).

These six components comprised the instructional improvement efforts in the LPI for all EACS sites. With the continuing and consistent implementation of the curriculum, this innovative collection of instructional strategies, including training for all personnel, constituted the educational intervention for impacting student achievement.

Based on information from EACS (Bakle, May 6, 2004, personal communication), no other educational innovations were implemented in the EACS during this time. This statement is consistent with the EACS Board actions concerning the $3.5 million grant requirements from the Foellinger Foundation.

In 2003 the East Allen County Schools' Board of School Trustees and staff members were recognized for the impact of their Learning Perspectives Initiative (based on the use of the Ruby Payne's *Instructional Framework*) when the American Association of School Administrators (AASA) presented them the Leadership Learning Award. EACS was one of only seven school districts throughout the United States to receive this honor.

Student Achievement Data Analyses

This section is composed of six parts:

- Overview
- Model Fidelity
- Research Design
- Available Data
- Statistical Analyses
- Summary

Overview

Determining the impact of the LPI and Ruby Payne's *Framework* (1995) on student achievement required the analysis of standardized assessment instrument data in multiple academic domains consistent with the mandates of the Elementary and Secondary Act Amendments of 2001 (the No Child Left Behind Act)—emphasizing research-based practices—and the requirements of Indiana statutes. The Indiana Department of Education required the use of the ISTEP+, which had two standardized academic measures—one norm-referenced and one criterion-referenced. First, the norm-referenced portion consisted of four summary scores—Total, Reading Composite, Language Composite, and Math Composite—expressed as Normal Curve Equivalents (NCEs). Second, the Indiana Academic Standards (criterion-referenced portion of ISTEP+) reflected the percentage of students who met or exceeded the standards in Mathematics, English/Language Arts, and Both. Both sets of dependent variables were used in this study.

Model Fidelity

Determining the consistency of the implementation of any model (model fidelity) is crucial to determining its impact on student achievement. Along with continuing professional development and technical assistance provided by **aha!** Process consultants, coaching and mentoring by personnel trained in the Training of Trainers—for the implementation of Payne's *Framework* (1995)—was provided. Novotny (2003) described characteristics present in EACS during the multi-year implementation of the LPI as follows:

- Staff collaborated during student/teacher day.
- Alignment of time/content in core areas was consistent.
- Instruction was driven by state standards.
- Measurement of student progress was used consistently.
- More time was taken to collect and analyze data.
- The alignment of the curriculum, the 10-question tests, and the benchmarks continued to drive instruction.
- Home contacts were a vital element.
- Understanding children required searching deeper for answers.
- Training about different cultures continued.
- The implementation of the five instructional strategies was expected.
- Gridding of quartile scores to record student growth was used.
- Data were assessed continuously.
- Trends in academic growth were monitored.
- Students were taught the school's expectations.
- Faculty and staff strived for a more effective understanding of the hidden rules of economic class.
- Systemic interventions were continuing to be implemented.
- Behavioral management training was followed up.
- Triangulation of student achievement profiles resulted from the gridding process.
- Excellent behavior was maintained through proactive programming.
- A safe, welcoming environment was provided.
- There was acknowledgment that the relationship between teachers and students had a significant impact on student achievement.
- There was a continuing focus on improving math and English skills for the most at-risk populations.
- Student agendas continued to be used to control student impulsivity.
- Returning to the practices of the past was not acceptable.
- There was continuation of increasing the practical use of the learning structures and instructional strategies (Novotny, 2003, pp. 7-8).

All of these are essential characteristics for the effective implementation of Payne's *Framework* (1995), indicating that it has been implemented in a high-fidelity manner.

Research Design

The LPI using the *Framework* was implemented through all EACS schools; thus, no control groups were available. However, there were multiple measurements of student achievement over time. Therefore, a time-series design (Campbell and Stanley, 1963) was used with cohorts of students over time. The advantages of this combination included the following:

- Maximized the consideration of progress on the same group of students over time rather than the traditional procedure of comparing students in one grade in one year to students in the same grade in another year.
- Used systemwide data that captured the variance across the system and minimized experimental mortality because of student migration to different schools within the system.
- Sample sizes remained large to provide stable estimates of impact of student achievement.
- Allowed for comparison of student achievement prior to and during implementation.

All ISTEP+ testing was conducted in September of each school year. The implementation of the *Framework* and the LPI began in the fall of school year 2000-01. Thus, data for determining the impact of the *Framework* and the LPI were available for three school years—2000-01, 2001-02, and 2002-03. Also, ISTEP+ data were available systemwide for only four grades (3^{rd}, 6^{th}, 8^{th}, 10^{th}) for 1998-2003. No individual data were available.

Seven cohorts were created based on available data—the most recent year of ISTEP+ data prior to model implementation in 2000 and one or more years of ISTEP+ data for school years 2000-01, 2001-02, or 2002-03. Table 1 describes the seven cohorts that were created.

Available Data

The available data for the ISTEP+ are indicated below:

ISTEP+. The norm-referenced portion of the ISTEP+ was administered to students in Grades 3, 6, 8, and 10 during school years 1998 through 2003 (ISTEP+ Data, 96-02 By Grade; ISTEP+ Data, 03 By Grade). The norm-referenced portion of the ISTEP+ was not administered in the Fall of 2003. For each cohort, mean NCEs were compared for each of three norm-referenced student achievement variables (Reading Composite, Language Composite, and Mathematics Composite) for each grade comparison within the cohorts.

Indiana Academic Standards. The criterion-referenced portion of the ISTEP+ was administered to students in Grades 3, 6, 8, and 10 during school years 1998-2003 (ISTEP+ Data, 96-02 By Grade; ISTEP+ Data, 03 By Grade). For each cohort, the percentage meeting or exceeding standards were compared for each of the

three criterion-referenced achievement variables (Mathematics, English/Language Arts, and Both) for each grade combination within the cohorts.

Analyses

The ISTEP+ (norm-referenced) and Indiana Academic Standards (criterion-referenced) data for these analyses are contained in the Appendix. A chi-square analysis was completed for each of the two sets of data comparing the student achievement differences (increases/equals/decreases) over years within and cohorts with the expected differences within and across cohorts based on a normal distribution.

Comparisons of Mean NCE Scores for Student Achievement as Measured by the ISTEP+. A chi-square (X^2) Goodness of Fit (Ferguson, 1966) was used to test the

Table 1

Cohort Definition by Year by Grade with Available Student Achievement Data for ISTEP+/Indiana Academic Standards

Cohort #	Years Participating in LPI	School Years 98	99	00	**01***	**02***	**03***
Cohort 1	3 years			3rd			**6th**
Cohort 2	2 years			3rd			**6th**
Cohort 3	3 years	3rd			**6th**		**8th**
Cohort 4	2 years			6th			**8th**
Cohort 5	3 years			6th		**8th**	**10th**
Cohort 6	2 years			8th			**10th**
Cohort 7	1 year			8th			**10th**

*Bold = Implementation of LPI Based on Ruby Payne's *Framework* (1995) for 2000-01, 2001-02, and 2002-03 School Years

hypothesis that the observed differences between NCE scores in Reading Composite, Language Composite, and Math Composite in comparisons across years and within cohorts (2 through 7) were not statistically significantly different from an expected normal distribution of differences. The Total Score was based on the three Composite Scores and therefore was dependent on the three Composite Scores; the statistic requires

only independent comparisons and thus the Total Scores were not included in the analysis. Also, there was no ISTEP+ norm-referenced testing in the Fall of 2003.

The observed differences were grouped into three categories—Increase (+), Equal (=), and Decrease (-). The criterion for these comparisons within cohorts was a minimal difference of 1.9 NCEs in mean scores to be rated either an Increase (+) or a Decrease (-). If such a difference was not evident, then the mean scores were considered to be Equal (=). Comparisons were made between successive score years for each cohort. Table 2 presents the results for these difference NCE comparisons.

Expected frequencies were calculated based on the 18 comparisons, using a normal distribution of 17% increases (greater than one standard deviation above the mean), 67% equals (less than or equal to one standard deviation above and below the mean), and 16% decreases (greater than one standard deviation below the mean). The normal distribution was used inasmuch as NCEs tend to be consistent estimates of student achievement over years.

Using Observed Values for differences and the Expected Values (based on a normal distribution), the resulting statistic was X^2 (Goodness of Fit) = 11.66 ($p < .01$). Thus, there was a statistically significant difference between the observed and expected values, with the increases being significantly higher than expected, the equals being significantly lower than expected, and the decreases being approximately equal to the expected. Students participating in LPI using Ruby Payne's *Framework* (1995) scored statistically significantly higher than would have been expected based on chance.

Inspection of these results indicate the following:

- The range of differences for increases was +3.8 to +9.7 NCEs; the range of differences for decreases was -2.1 to -4.9 NCEs.
- 78% (14/18) of the differences in Mean NCEs across all three academic areas were increases (8/18) or equal (6/18).
- The greatest absolute increases were for the 10^{th} vs. 8^{th} grade comparisons for all three academic areas.
- The greatest number of decreases were for 8^{th} vs. 6^{th} grade comparisons in Language Composite and Mathematics Composite.
- There appears to be a cumulative effect on academic achievement over time for participation in the LPI using Ruby Payne's *Framework* (comparison of Cohort 2 with two years and Cohort 3 with three years of participation).
- The increases are practically significant in terms of size across all three academic areas.

Table 2

Differences in Absolute Mean NCE Scores for Student Achievement as Measured by the ISTEP+ for Comparisons Within Cohorts 2-7 (n = 18 Comparisons) *

Cohort	Reading Composite	Language Composite	Mathematics Composite
Cohort 2 (6^{th} vs. 3^{rd})	+ .5 (=)	- .2 (=)	0 (=)
Cohort 3 (6^{th} vs. 3^{rd})	+4.0 (+)	+5.3 (+)	+5.0 (+)
Cohort 4 (8^{th} vs. 6^{th})	-1.1 (=)	-3.7 (-)	-4.9 (-)
Cohort 5 (8^{th} vs. 6^{th})	+ .1 (=)	-2.1 (-)	-3.1 (-)
Cohort 6 (10^{th} vs. 8^{th})	+ .6 (=)	+6.3 (+)	+9.7 (+)
Cohort 7 (10^{th} vs. 8^{th})	+3.8 (+)	+4.9 (+)	+9.6 (+)

* Criteria: Increase—More than 1.9+ Mean NCE Difference
Equal—Between -1.9 and + 1.9 Mean NCE Difference
Decrease—More than -1.9 Mean NCE Difference

	Observed	Expected (normal distribution)
Increase (+)	8	3
Equal (=)	6	12
Decrease (-)	4	3

$X^2 = 11.66$ ($p<.01$) Goodness of Fit

($X^2_{(2\ df,\ .01)} = 9.21$)

These results are both statistically and practically significant indicating that the LPI using Ruby Payne's *Framework* (1995) significantly impacted student achievement as measured by the ISTEP+ norm-referenced tests.

Comparison of Percentage of Students Meeting/Exceeding Standards on ISTEP+ for Mathematics, English/Language Arts, and Both for All Seven Cohorts. A chi-square Goodness of Fit was used to test the hypothesis that the observed differences between percentage difference in meeting or exceeding standards in Mathematics, English/Language Arts, and Both areas within and across all seven cohorts were not statistically significantly different from an expected normal distribution of differences.

The criterion for these comparisons within cohorts was a minimum of 2% difference to be rated either an Increase (+) or a Decrease (-). If such a difference was not evident, then the scores were considered to be Equal (=). Comparisons were made between successive score years for each cohort. Table 3 presents the results for these comparisons.

Using Observed Values (Total Increases, Total Equals, and Total Decreases) and Expected Values based on 33 comparisons (Increases = 17%, Equals = 67%, Decreases = 16%), again using the normal distribution, the resulting X^2 (Goodness of Fit) = 45.11 ($p < .001$). Thus, there was a statistically significant difference between the observed and expected values with the Increases being higher than expected, the Equals being much lower than expected, and the Decreases being approximately equal to what was expected. Students participating in the LPI using Payne's *Framework* (1995) scored statistically significantly higher than would have been expected based on chance.

Inspection of these results indicate the following:

- The range of differences for increases was +6% to +17%; the range of differences for decreases was -5% to -9%.
- 61% (20/33) of the comparisons indicated that students exceeded the prior year's percentage of meeting/exceeding standards across all three content areas.
- 45% (5/11) of the comparisons indicated that students exceeded the prior year's percentage of meeting/exceeding standards in the Mathematics area.
- 73% (8/11) of the comparisons indicated that students exceeded the prior year's percentage of meeting/exceeding standards in the English/Language Arts area.
- 64% (7/11) of the comparisons indicated that students exceeded the prior year's percentage of meeting/exceeding standards in Both areas.
- The 10^{th} vs. 6^{th} grade comparisons and the 10^{th} vs. 8^{th} grade comparisons had the most increases in all three areas.

Table 3

Differences in Percentages of Students Meeting/Exceeding
Indiana Academic Standards
for Comparisons within Cohorts (n = 33 Comparisons) *

Cohort	Grade Comparison	English/Language Mathematics	Arts	Both
Cohort 1	(6^{th} vs. 3^{rd})	-7% (-)	+14% (+)	+6% (+)
Cohort 2	(6^{th} vs. 3^{rd})	-5% (-)	+2% (=)	+2% (=)
Cohort 3	(6^{th} vs. 3^{rd})	-8% (-)	-9% (-)	-7% (-)
	(8^{th} vs. 3^{rd})	-9% (-)	+6% (+)	0 (=)
	(8^{th} vs. 6^{th})	-1% (=)	+12% (+)	+7% (+)
Cohort 4	(8^{th} vs. 6^{th})	-4% (-)	+8% (+)	+2% (=)
Cohort 5	(8^{th} vs. 6^{th})	+3% (+)	+11% (+)	+8% (+)
	(10^{th} vs. 6^{th})	+17% (+)	+12% (+)	+16% (+)
	(10^{th} vs. 8^{th})	+14% (+)	+ 1% (=)	+8% (+)
Cohort 6	(10^{th} vs. 8^{th})	+12% (+)	+ 3% (+)	+10% (+)
Cohort 7	(10^{th} vs. 8^{th})	+8% (+)	+6% (+)	+6% (+)

* Criteria: Increase—More than 2% Meeting or Exceeding Standard
Equal—Between -2% and + 2% Meeting or Exceeding Standard
Decrease—More than -2% Meeting or Exceeding Standard

	Observed	Expected (normal distribution)
Increase (+)	20	6
Equal (=)	6	22
Decrease (-)	7	5

$X^2 = 45.11$ ($p<.001$) Goodness of Fit

($X^2_{(2\ df,\ 0.01)} = 13.82$)

These results are both statistically and practically significant indicating that the LPI using the Payne *Framework* (1995) had significant impact on increasing student achievement as measures by the criterion-referenced portion of the ISTEP+.

Summary

The ISTEP+ provided two sets of dependent variables (one norm-referenced and one criterion-referenced) to assess student achievement. Both of the results comparing the distribution of the observed and expected difference scores within and across seven cohorts across six years of pre-treatment and implementation data were statistically significant (the norm referenced at the $p<.01$ and the criterion-referenced at the $p<.001$ levels level). Considering the sizes of the differences on the two sets of variables, the results were also practically significant. While results were significant across all domains tested, the most significant growth in student achievement occurred in the domains of Reading Composite, Language Composite, and English/Language Arts.

Student participation in the LPI using Payne's *Framework* (1995) resulted in more increased student achievement than would have been expected by chance based on two dependent measures of student achievement.

Recommendations for Continued Investigation of Impact

Considering the longitudinal nature of these data and the continued use of the ISTEP+, several areas should be the focus for continued investigation to determine the impact of the LPI and Ruby Payne's *Instructional Framework* (2001):

- Refine the cohorts to include only students who participated in the LPI for three or more years; exclude from analysis those students who in-migrated to or out-migrated from the EACS. This would provide a cleaner determination of the impact on student achievement. It might be appropriate to use an Analysis of Covariance—using appropriate covariates for the varied academic areas—to determine particular statistically significant growth correcting for prior performance.
- Analyze EACS data with those from the state level and compare the results with a system similar in demographics that is not using Payne's *Framework* (1995).
- Analyze SAT/ACT scores and post-secondary participation to follow up data for longer-term impact.
- Analyze the differences in student achievement across disaggregations—gender, race/ethnicity, LEP, SES, and disabilities.
- Analyze attendance rates, dropout rates, and graduation rates—particularly for the high school—to ensure that the distribution of all students has not been truncated.

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Appendix

ISTEP+ Scores (Mean NCEs) and Percentage Meeting/Exceeding Indiana Academic Standards:
East Allen County Schools, 1998-2003

Cohort	ISTEP+ Scores (NCEs)/ Indiana Academic Standards (Percentages)	Grade/Year/Scores		
Cohort 1		3rd: 2000	**6th: 2003**	
	ISTEP+			
	Total	61.7	NA	
	Reading	57.4	NA	
	Language	61.7	NA	
	Math	65.8	NA	
	Standards			
	Eng/LA	*74%*	*67%*	
	Math	*61%*	*75%*	
	Both	*56%*	*62%*	
Cohort 2		3rd: 1999	**6th: 2002**	
	ISTEP+			
	Total	56.7	56.8	
	Reading	54.1	54.6	
	Language	55.6	55.4	
	Math	60.3	60.3	
	Standards			
	Eng/LA	*71%*	*66%*	
	Math	*61%*	*63%*	
	Both	*54%*	*56%*	
Cohort 3		3rd: 1998	**6th: 2001**	**8th: 2003**
	ISTEP+			
	Total	54.3	59.0	NA
	Reading	51.9	55.9	NA
	Language	52.9	58.2	NA
	Math	58.0	63.0	NA
	Standards			
	Eng/LA	*68%*	*60%*	*59%*
	Math	*61%*	*52%*	*67%*
	Both	*53%*	*46%*	*53%*

Appendix (continued)

Cohort	ISTEP+ Scores (NCEs)/ Indiana Academic Standards (Percentages)	Grade/Year/Scores		
Cohort 4		6th: 2000	**8th: 2002**	
	ISTEP+			
	Total	58.7	55.5	
	Reading	57.0	55.9	
	Language	58.9	55.2	
	Math	60.1	55.0	
	Standards			
	Eng/LA	*61%*	*57%*	
	Math	*49%*	*57%*	
	Both	*45%*	*46%*	
Cohort 5		6th: 1999	**8th: 2001**	**10th: 2003**
	ISTEP+			
	Total	56.7	55.1	NA
	Reading	55.3	55.4	NA
	Language	57.4	55.3	NA
	Math	57.3	54.2	NA
	Standards			
	Eng/LA	*53%*	*56%*	*70%*
	Math	*54%*	*65%*	*66%*
	Both	*43%*	*51%*	59%
Cohort 6		8th: 2000	**10th: 2002**	
	ISTEP+			
	Total	54.8	60.4	
	Reading	56.4	57.0	
	Language	54.5	60.9	
	Math	53.2	62.9	
	Standards			
	Eng/LA	*53%*	*65%*	
	Math	*64%*	*67%*	
	Both	*47%*	*57%*	

Appendix (continued)

Cohort	ISTEP+ Scores (NCEs)/ Indiana Academic Standards (Percentages)	Grade/Year/Scores	
Cohort 7		8th: 1999	**10th: 2001**
	ISTEP+		
	Total	53.8	60.0
	Reading	54.8	58.6
	Language	55.1	60.0
	Math	51.3	60.9
	Standards		
	Eng/LA	*55%*	*63%*
	Math	*64%*	*70%*
	Both	*51%*	*57%*