Impact of the Payne School Model on Student Achievement

Ridgeroad Middle Charter School
North Little Rock, Arkansas

Interim Report: 2003-04 Data

Center for Study of
ECONOMIC
DIVERSITY

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Abstract

Analyses of covariance—using 2003-04 test scores on Arkansas standardized test in Literacy and Mathematics as dependent variables for students in grade 8 and prior standardized test scores in 2001-02 in the same domain as the covariates—were used with two groups (students served in Ridgeroad Middle Charter School using the Payne School Model and students served in a comparison middle school in the same district) to determine the impact of the Payne School Model on student achievement. For the Total Groups in Literacy, there was a statistically significant difference in favor of Ridgeroad Middle Charter School; there was also a statistically significant result by gender in favor of females. For the Total Groups in Mathematics, there were no statistically significant differences. These results indicate that there is a significant impact of the Payne School Model with students in grade 8 as compared to students being served using a traditional approach.

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Introduction and Purpose

The federal No Child Left Behind Act (2001) and corresponding state legislation throughout the United States requires that schools use "research based" programs to increase student achievement in all academic areas, with particular emphasis on reading/English/language arts and mathematics. Consistent with these mandated foci on student achievement, Dr. Ruby K. Payne initiated research to determine the impact of the implementation of her model—*A Framework for Understanding Poverty*, *Learning Structures*, and *Meeting Standards & Raising Test Scores* materials and training—on student achievement in the areas of reading/English/language arts and mathematics. Currently, 19 schools in five school systems (one in each of five states) have committed to receiving technical assistance for model implementation and have agreed to share standardized test data required to determine the impact of the model on student achievement.

Methodology

The research design to determine impact had two dimensions. The first dimension was establishing model fidelity at each school. Each experimental school must be implementing the model effectively for it to improve student achievement. The second dimension was determining the statistical significance of the impact of Payne's model on student achievement in reading/English/language arts and mathematics. The design for this analysis was a post-test-only comparison design for two groups (cohorts) using the analysis of covariance to adjust for initial differences at an experimental school (using the model) and a comparison school (not using the model).

Model Fidelity

Two aha! Process, Inc. instruments (*Instructional Framework—Observation Scale* and *Instructional Framework—Artifacts/Conference Scale*) were used to assess the fidelity of the implementation of Payne's model. The first instrument consisted of 47 indicators criterion-referenced to key model components/activities; the second consisted of 34 indicators also criterion-referenced to key model components/activities. Both instruments were used by aha! Process consultants/project supervisors to determine the fidelity of the implementation of the model. The median inter-rater reliability for the first instrument is .83, with a range from .72 to .95; for the second, the median inter-rater reliability is .92, with a range from .82 to .97. The final required level of model fidelity was implementation of 80% of the model components over two years.

Analysis of Student Achievement Data

A post-test-only comparison design for two groups (experimental group—a school implementing Payne's model; comparison group—a school implementing a traditional approach) utilizing the analysis of covariance to adjust for initial differences between two groups was used to determine the statistical impact of the implementation of the model on student achievement. The independent variable was the implementation or non-implementation of the model. The dependent variables were standardized test scores in both reading/English/language arts and mathematics. The covariates were prior test scores

in reading/English/language arts and mathematics. Consistent with requirements of No Child Left Behind and corresponding state legislation, analyses were conducted for the total groups, as well as the five disaggregations (gender, race/ethnicity, LEP, SES, and disability) where the groups met the minimal sample size of 40. The level of statistical significance was set at $p < .05$. In order for a student to be included in a cohort, the student must have participated in the implementation of the model for a minimum of six months and have all data on all variables, including demographics.

Context for Ridgeroad Middle Charter School

Ridgeroad Middle Charter School, located in North Little Rock, Arkansas, served 511 seventh- and eighth-grade students, 79% of whom received free or reduced-price lunches. Ridgeroad administrators and faculty have been involved with aha! Process since the 2003–04 school year in implementing the Payne Model. All staff received training in *A Framework for Understanding Poverty* and *Learning Structures* from local district certified trainers. In June 2003 an aha! Process consultant provided training to all Ridgeroad staff in middle school concepts. aha! Process consultants provided a two-day training in *Meeting Standards & Raising Test Scores.* Content specialists were included in providing this training for content-specific support. Eight content-specific technical assistance sessions were originally scheduled during the school year for each content area. Also, the Director of Research and Development for aha! Process provided 14 days of planning assistance with the campus leadership team during the school year.

The comparison middle school also is located in the North Little Rock School District serving approximately 200 middle school students in grades 7 and 8. There were 149 students in the eighth grade at Ridgeroad who met the cohort inclusion criteria; there were 82 students at the comparison middle school who met the cohort inclusion criteria. Table 1 provides the demographic characteristics by school.

Table 1: Demographics of the Cohorts at Two Schools

Demographic Variables	Ridgeroad (Experimental)	Comparison Middle School (Comparison)
Sample Size	149	82
Gender		
Female	75	42
Male	74	40
Race		
Caucasian	32	3
African-American	112	78
Hispanic	5	-
Asian/Other	-	1
Socioeconomic Status		
Poverty	32	11
Non-Poverty	117	71

English/Language Arts

aha! Process provided 12 days of technical assistance to English/language arts teachers, with each teacher receiving an average of five days of technical assistance. As a group, teachers were initially scheduled to receive eight days of technical assistance during the school year; four days were added to provide more support. During the first semester, teachers completed student-data grids, set goals for the year, modified time-and-content grids (which were developed during the *Meeting Standards* training), discussed discipline issues, reviewed strategies for controlling impulsivity, and discussed benchmark tests and item analysis. The second semester's technical assistance focused on analyzing data from mock benchmark assessments to identify target students and target standards, developing bell work to reinforce target standards, modifying time-and-content grids to reflect new standards, analyzing failure rates and developing interventions, discussing differentiation of instruction, discussing home contacts, and planning for the next school year. In addition, an aha! Process consultant demonstrated lessons and conducted classroom observations both semesters.

Math

aha! Process provided nine days of technical assistance to math teachers. Each teacher received an average of six days of technical assistance. As a group, teachers were initially scheduled to receive eight days of technical assistance during the school year. One day was added at the request of campus leaders. During the first semester, teachers completed time-and-content grids that were begun during the *Meeting Standards* training, used the

grids to develop daily lesson plans, reviewed benchmark assessment data and made plans for remediation, analyzed failure rates and developed interventions, discussed strategies that have been successful in the classroom, and discussed ways to use step sheets as a planning tool for their students. The second semester's technical assistance focused on analyzing mock benchmark data and interventions to address weakest performance on standards, analyzing grade distributions and identifying how to help students be more successful, using the Payne Lesson Design for lesson planning, and revising time-and-content grids for the coming school year. In addition, lessons were demonstrated, and classroom observations were conducted both semesters. Two additional days of technical assistance were provided during the summer to complete time-and-content grids and develop lesson plans for the first nine weeks of the 2004–05 school year.

Science

Eight days of technical assistance were provided to science teachers by an aha! Process consultant. Each teacher received an average of 4½ days of technical assistance. During the first semester, teachers reviewed time-and-content grids developed during the *Meeting Standards* training, began development of benchmark assessments, discussed how to track student progress by standards, and discussed using the Payne Lesson Design for lesson planning. The second semester's technical assistance focused on reviewing strategies for controlling impulsivity, planning lessons using the Payne Lesson Design, creating step sheets, reviewing question making, developing open-ended questions, and reviewing time-and-content grids. In addition, an aha! Process consultant demonstrated lessons and conducted classroom observations both semesters.

Social Studies

aha! Process provided eight days of technical assistance to social studies teachers, with each teacher receiving an average of four days of technical assistance. During the first semester, teachers reviewed instructional strategies, worked on time-and-content grids, worked on lesson planning, reviewed data to help develop aligned assessments, and reviewed lesson plans and questions the teachers had developed. In the second semester, social studies technical assistance focused on reviewing data relevant to grades vs. assessment scores, analyzing student work, developing a time-and-content grid for Arkansas history, and revising time-and-content grids for other courses. In addition, an aha! Process consultant conducted classroom observations both semesters.

Related Arts

aha! Process provided three half-day technical assistance sessions for the related arts teachers. In the first semester, teachers reviewed the concepts from foundational trainings specifically focusing on discipline, planning, and input strategies. Teachers also discussed classroom management and their role in their students' growth. During the second semester, the teachers were introduced to the concept of resources found in the *Framework* training. The importance of relationships was a focus throughout all three sessions. In addition, an aha! Process consultant conducted classroom observations.

Other Factors Impacting the School

There were several factors that impacted Ridgeroad Middle School in 2003–04. First, the school became a Charter School in 2003–04. Second, the principal received additional assistance from central office in leading the school. And third, teacher turnover from 2002–03 to 2003–04 was significant. Of the 32 teachers in core subjects and special education, seven were rehired from Ridgeroad Middle School, five teachers were new to the profession, and five were teachers working through non-traditional licensure.

Dependent Variables and Covariates

The dependent variables were the eighth-grade benchmark literacy assessment and the eighth-grade benchmark math assessment—the two standardized tests used by the Arkansas Department of Education for assessing student performance in literacy and mathematics, respectively, in 2003–04. The covariates were the related standardized tests in the same areas when these students were sixth-graders in 2001–02. Additional information about these and other standardized tests are available through the Arkansas Department of Education (www.arkedu.k12.ar.us). Specific statewide data by system are provided at http://adedata.k12.ar.us:8080/index1.ade. An overview of testing used in Arkansas is provided at www.idhi.uky,edu/sparc/states/ar.pdf.

Results

The results are presented in two sections—model fidelity and student achievement.

Model Fidelity

The model fidelity was not assessed for 2003–04, and thus no information is included here. [Note: Model fidelity data for 2004–05 indicated that eight teachers scored between 80% and 100% on the Observation Instrument and that seven teachers scored between 47% and 79% implementation; 20 teachers were assessed in the areas of math, science, social studies, and English/language arts.]

Student Achievement

Table 2 (Appendix) contains an overview summary of the results for both Literacy and Mathematics. Four analyses of student achievement data were conducted for both dependent variables: Total Group, Gender by School, Race by School, and Poverty vs. Non-Poverty (Free/Reduced-Price Lunch vs. Non-Free/Reduced-Price Lunch). A narrative explanation of the results is provided below for each analysis.

Literacy - The complete results for Literacy are contained in Table (Appendix). The following are narrative explanations for each of the four analyses conducted for Literacy.

Total Groups. The one-way analysis of covariance indicated that the difference between the adjusted means (Ridgeroad: M = 184.09; Comparison Middle: M = 179.58) approached statistical significance [$F(1,288) = 3.62$, $p < .058$]. This result indicates that the

mean for Ridgeroad was about 4.5 points higher on the benchmark literacy assessment than for Comparison Middle and strongly suggests that the implementation of the model has had significant practical impact and nears statistical significance at the $p < .05$ level.

Gender by School. The two-way analysis of covariance indicated that the difference between the adjusted means approached statistical significance between the females at the two schools (Ridgeroad: M = 187.93; Comparison Middle: M = 180.00) but not the males (Ridgeroad: M = 180.28; Comparison Middle: M = 179.02). There difference between the schools approached significant differences [$F(1,226) = 3.86$, $p < .051$] as did the difference between the genders [$F(1,226) = 3.20$, $p < .075$)]. These results suggest some differential impact on females but not males.

Race by School. There were no results that approached statistical significance by race. While the Ridgeroad means by racial group were higher than those for Comparison Middle, the means were not statistically significantly different.

Free/Reduced-Price School Lunch by School. The number of students in each school on free/reduced-price school lunch was large. While the adjusted means for Ridgeroad were higher for both students receiving free/reduced-price school lunch and those not receiving free/reduced-price school lunches as compared with Comparison Middle, the results did not approach statistical significance. However, both groups of students improved their performance over the previous year, indicating that Payne's Model has significant impact on both students from poverty and those students who are not from poverty.

Mathematics. - The complete results for the eighth-grade benchmark math assessment are contained in Table 3 (Appendix). The following are narrative explanations for each of the four analyses conducted for Mathematics.

Total Groups. The one-way analysis of covariance indicated that the difference between the adjusted means (Ridgeroad: M = 139.25; Comparison Middle: M = 139.64) were not statistically significantly different [$F(1,288) =.297$, $p < .586$]. The adjusted means were essentially equal.

Gender by School. The two-way analysis of covariance indicated that the difference between the adjusted means between the females at the two schools (Ridgeroad: M = 151.25; Comparison Middle: M = 141.45) and the males (Ridgeroad: M = 139.78; Comparison Middle: M = 136.78) [$F(1,226) = .32$, $p < .573$] between the two schools and between the schools by gender [$F(1,226) = .00$, $p < .996$] were not statistically significantly different.

Race by School. While the Ridgeroad means by racial group were higher than those for Comparison Middle, the means were not statistically significantly different.

Free/Reduced-Price School Lunch by School. The number of students in each school on free/reduced-price school lunch was large. While the adjusted means for Ridgeroad were higher for both students receiving free/reduced-price school lunch and

those not receiving free/reduced-price school lunches as compared with Comparison Middle, the results did not approach a statistically significant difference.

Conclusions/Recommendations

The results suggest that there is significant impact of the Payne Model in increasing student achievement in literacy for the eighth-graders for Ridgeroad as compared with Comparison Middle. The emphasis for Ridgeroad English, science, and social studies teachers during the first year of implementation of the model was primarily on literacy. While model fidelity scores for the 2003–04 year were not obtained, it would be projected that the model fidelity for the first year (2003–04) would be lower than the model fidelity for the second year (2004–05). The second year of implementation, with higher model fidelity, is anticipated to result in improved student achievement in literacy as compared with the school using a traditional approach. Considering the array of factors influencing the school and the implementation of the model, the results in the literacy area surpassed building level and system level expectations. Based on additional technical assistance, the significant results are anticipated to increase for 2004–05.

Regarding student achievement in mathematics, while the direction of the gains was higher for Ridgeroad than for Comparison Middle, statistically significant differences between the two schools were not achieved. Based on informal qualitative inquiry, it may have been that the quality of model fidelity may have been lower with teachers in mathematics in the first semester than was true for teachers in the area of literacy. Another factor that may have contributed was the adaptation to following an on-grade level time and content grid. Also, during the second semester, teachers focused on implementing a plan-and-label process for math problem solving. This was successful for the multiple-choice items tested. However, due to time constraints, little emphasis was place on instruction related to open-ended response items that account for half of the benchmark mathematics score. Finally, the overall emphasis by the majority of teachers at the school was on literacy.

Table 2: Analyses of Covariance for Literacy

A. **TOTAL GROUPS**

1. Descriptive Statistics:

School	N	Mean	SD
Ridgeroad:	149	185.23	32.06
Comp. Middle:*	82	177.50	29.61
Total:	231	182.49	31.37

* Comp. Middle = Comparison Middle

2. Inferential Statistics (One-Way Analysis of Covariance):

Between Schools: **F(1,228) = 3.622 p<.058**

Adjusted Means: ***Ridgeroad:*** ***184.09***
Comp. Middle: ***179.58***

B. **GENDER BY SCHOOL**

1. Descriptive Statistics:

	Female			Male		
School	N	Mean	SD	N	Mean	SD
Ridgeroad:	75	197.92	28.53	74	172.38	30.43
Comp. Middle:	42	181.93	32.38	40	172.85	26.00
Total:	117	192.18	30.81	114	172.54	28.84

2. Inferential Statistics (Two-Way Analysis of Covariance):

Between Schools:	**F(1,226) = 3.86**	**p < .051**
Between Genders:	**F(1,226) = 3.20**	**p < .075**
School x Gender:	F(1,226) = 2.00	p < .158

		Female	*Male*
Adjusted Means:	***Ridgeroad:***	***187.93***	***180.28***
	Comp. Middle	***180.00***	***179.02***

C. **RACE BY SCHOOL**

1. Descriptive Statistics

	01			02			03			04		
School	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Ridgeroad:	32	209.38	30.02	112	178.63	30.05	5	178.80	7.26	-	-	-
Comp. Middle:	3	197.00	40.63	78	176.44	29.56	-	-	-	1	202.00	x
Total:	35	208.31	30.51	190	177.73	29.67	5	178.80	7.26	1	202.00	x

2. Inferential Statistics (Two-Way Analysis of Covariance):

Between Schools:	F(1,224) = 1.07	p < .302
Between Races:	F(1,224) = 1.29	p < .278
School x Race:	F(1,224) = .25	p < .614

		01	*02*	*03*	*04*
Adjusted Means:	***Ridgeroad:***	***191.97***	***182.26***	***175.64***	-
	Comp. Middle	***183.43***	***179.47***	-	***170.328***

D. **FREE/REDUCED BY SCHOOL**

1. Descriptive Statistics:

School	Free/Reduced: NO			Free/Reduced: YES		
	N	Mean	SD	N	Mean	SD
Ridgeroad:	32	200.06	28.85	117	181.18	31.81
Comp. Middle:	11	180.18	26.56	71	177.08	30.21
Total:	43	194.98	29.61	188	179.63	31.20

2. Inferential Statistics (Two-Way Analysis of Covariance):

Between Schools: $F(1,226) = 1.790$ $p < .182$
Between Free/Reduced: $F(1,226) = .630$ $p < .428$
School x Free/Reduced: $F(1,226) = .002$ $p < .964$

		No	*Yes*
Adjusted Means:	*Ridgeroad:*	*186.27*	*183.50*
	Comp. Middle	*181.71*	*179.24*

Table 3: Analyses of Covariance for Mathematics

A. **TOTAL GROUPS**

1. Descriptive Statistics:

School	N	Mean	SD
Ridgeroad:	149	145.56	39.50
Comp. Middle:*	82	138.82	41.12
Total:	231	143.16	40.15

2. Inferential Statistics (One-Way Analysis of Covariance):

Between Schools: $F(1,228) = .297$ $p < .586$

Adjusted Means: ***Ridgeroad:*** ***139.25***
Comp. Middle: ***139.64***

B. **GENDER BY SCHOOL**

1. Descriptive Statistics:

	Female			Male		
School	N	Mean	SD	N	Mean	SD
Ridgeroad:	75	151.25	40.82	74	139.78	37.52
Comp. Middle:	42	141.45	44.94	40	136.05	37.23
Total:	117	147.74	42.42	114	138.47	37.30

2. Inferential Statistics (Two-Way Analysis of Covariance):

Between Schools: **F(1,226) = .32 p < .573**
Between Genders: **F(1,226) = .52 p < .470**
School x Gender: F(1,226) = .00 p < .996

		Female	*Male*
Adjusted Means:	***Ridgeroad:***	***141.56***	***143.64***
	Comp. Middle	***143.17***	***145.28***

C. **RACE BY SCHOOL**

1. Descriptive Statistics

	01			02			03			04		
School	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Ridgeroad:	32	178.44	36.65	112	136.09	35.92	5	147.20	19.41	-	-	-
Comp. Middle:	3	140.00	51.39	78	138.17	41.08	-	-	-	1	186.00	x
Total:	35	175.14	38.72	190	136.94	38.03	5	147.20	19.41	1	186.00	x

2. Inferential Statistics (Two-Way Analysis of Covariance):

Between Schools: F(1,224) = .98 p < .322
Between Races: F(1,224) = .46 p < .714
School x Race: F(1,224) = 2.54 p < .112

		01	*02*	*03*	*04*
Adjusted Means:	***Ridgeroad:***	***151.22***	***140.26***	***142.98***	-
	Comp. Middle	***134.64***	***144.12***	-	***162.35***

D. **FREE/REDUCED BY SCHOOL**

1. Descriptive Statistics:

School	Free/Reduced: NO			Free/Reduced: YES		
	N	Mean	SD	N	Mean	SD
Ridgeroad:	32	163.03	42.53	117	140.78	37.42
Comp. Middle:	11	144.73	38.47	71	137.90	41.79
Total:	43	158.35	41.87	188	139.69	39.04

2. Inferential Statistics (Two-Way Analysis of Covariance):

Between Schools:	$F(1,226) = .76$	$p < .385$
Between Free/Reduced:	$F(1,226) = .06$	$p < .809$
School x Free/Reduced:	$F(1,226) = .49$	$p < .486$

		No	*Yes*
Adjusted Means:	*Ridgeroad:*	*186.27*	*183.50*
	Comp. Middle	*181.71*	*179.24*