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A Longitudinal Study of a 5th Grade Science Curriculum Based on the 5E Model

Abstract

The Center for Mathematics and Science Education at Texas A&M University contracted with Region 4 Education Service Center (ESC) and a large, diverse school district to conduct a longitudinal study from 2005 – 2009. The state achievement test scores of 5th graders who were taught using a Grade 5 science textbook designed by Region 4 ESC were analyzed in this study. While the text emphasized instruction via the 5E Instructional Model, the study was undertaken to determine if sustained training and utilization of the texts by teachers and students changed the participating district's science achievement gaps at Grade 5. The school district provided their 5th grade student state science achievement test scores. Baseline data were generated from 2004 – 2005 scores and compared with scores from 2005 - 2009. Descriptive statistics were used to determine group means, standard deviations, and standard errors. Analysis of variance (ANOVA) tests were used to differentiate state science achievement group means by Test Administration Date, Gender and Ethnicity. Analysis of means by ethnicity revealed an observable achievement gap between White, African American, and Hispanic students. Science scale score means by ethnicity increased over the 5-year span. While significant 2 – way interactions were determined between Test Administration Date and Gender, Test Administration Date and Ethnicity, and Gender and Ethnicity, the effect for the interactions were all small. Thus the SMEs for the interactions were not provided. Overall, the district's African American and Hispanic achievement gaps were greatly reduced, more so than the state achievement gap during the same time period.

Keywords: achievement gap, 5E Instructional Model, elementary curriculum, inquiry, ANOVA

Introduction

In *Rising Above the Gathering Storm* (2007), the National Academies pointed to a lack of basic knowledge in science, technology and mathematics necessary for success in modern society. In response to this crisis in science literacy, Region 4 Education Service Center (ESC) created a textbook utilizing the 5E Instructional Model and specifically addressing the state standards. At the beginning of the 2005-2006 academic year, the Center for Mathematics and Science Education at Texas A&M University contracted with Region 4 ESC and a large, diverse school district serving over 13,000 students to conduct a longitudinal study of the effectiveness of implementing the Grade 5 science textbook program. A five-year study (2005-2009) was conducted on high stakes achievement results of 5th graders (from 14 different elementary programs), who were taught using Region 4 ESC-designed textbooks. Teachers were trained by Region 4 curriculum specialists and student and teacher textbooks were furnished for each trained teacher's science classroom. The science Texas Assessment of Knowledge and Skills (TAKS) provided the standard for measurement of student achievement, and scores of 5th grade students taught through the Region 4 ESC-designed textbook program over the next four years were tracked to determine the impact of the program on student achievement.

The 2004-2005 academic year served as the baseline, and the following research question guided this study:

- How do 5th grade science scores change as a result of the use of a textbook that utilizes the 5E Instructional Model?

Background

According to *The Nation's Report Card Science State Snapshot Report* (NCES IES, 2009) for Texas Grade 4 and Grade 8, students overall performed at a level not significantly different than the national average. However, African American, Hispanic, and low socioeconomic status (SES) students performed significantly lower than White students in Texas and around the nation. It was hoped that the newly created textbook program would improve all student scores and narrow the achievement gaps for African American, Hispanic, and low SES students. The district was chosen for the study because its demographics mirror urban school settings where student achievement and achievement gaps between ethnic and socioeconomic groups are most critical.

The Region 4 ESC textbook program is built on the state science curricular standards, the Texas Essential Knowledge and Skills (TEKS), and is based on five guiding principles adapted from recommendations of the *National Science Education Standards* (1996), *Benchmarks for Science Literacy* (1993), and other salient science education publications:

1. Science is for all students;
2. Learning science is an active process that includes both individual and social processing;
3. Students must accept and share responsibility for their own learning;
4. Teachers must consistently model the habits of mind necessary for scientific literacy, including values, attitudes, communication skills, and critical thinking; and
5. Curriculum, instruction, and assessment must be specifically aligned. (McComber, McClane, & Mock, 2006, p. vii)

The authors of the textbook strive to strike a balance in the topics covered and

Table 1: Summary for Numbers of Students in Each Year

Year	Total 5th grade students	Final* 5th grade students
2005**	990	928
2006	1052	981
2007	1098	983
2008	1161	993
2009	1109	1035

Note: *Extracted duplicated students and Spanish test takers.
**Baseline

the depth of the science content learned, as recommended by DeBoer (2000). The teacher is afforded adequate instructional time for the necessary science concepts and process skills to be developed effectively for student understanding. The Grade 5 science textbook has an instructional plan that is vertically articulated, with knowledge and skills building on the previous year's experiences to extend to a wider and deeper understanding of the same content. Instructional materials include 5E Model (Bybee et al., 2006) lessons and a wide variety of instructional strategies to teach core concepts and processes. A meta-analysis (Schroeder, Scott, Tolson, Huang, and Lee, 2007) of over 25 years of research of effective science instruction highlights many of the exemplary strategies utilized in the textbook, including contexualization, collaboration, hands-on learning, questioning strategies, inquiry and assessment. Based on current literature about science reform, the 5E Model is very much aligned with best practices. Lessons are designed to fully develop math, problem-solving, reading and writing skills. Additional curricular materials include mini-assessments aligned to the state standards, performance tasks and simulations of the state common assessment (Texas Assessment of Knowledge and Skills, also known as TAKS) for each grade level. In Texas, the state provides one common set of standards, the Texas Essential Knowledge and Skills (TEKS). Districts are free to use any curricula that address the standards.

The 5E Instructional Model is based on a combination of Constructivist Learning Theory and Conceptual Change Learning Theory, accounting for the structure and organization of the Model (Bybee et al., 2006). The organization of the 5E Model systematizes academic content. The five phases of the instructional model are Engage, Explore, Explain, Elaborate, and Evaluate. It is important to note that the teacher leads, models and facilitates throughout the lesson cycle. The curriculum guides the teacher through this process, prompting them with facilitation questions and supplying background information. The approach is very much student centered and is more about discovery and deeper understanding than direct instruction. Students are introduced to academic content during the Engage component of the Model. This phase helps students to connect their previous learning experiences and background knowledge to newly presented content. Engage activities may be question stems or activities such as discrepant events that elicit discussion and focus student attention on an instructional goal. Student misconceptions may be exposed, and students are actively motivated to engage in the learning. The following phase, Explore, requires interactive, hands-on activities designed to allow students to connect their observations and experiences to formulate concepts and skills. Following exploration is the Explain component, wherein students are allowed to discuss their observations and experiences. It requires students to reveal their observations, newly formed definitions, and understanding of the content. During the Explain phase, the teacher validates or re-teaches content and helps students connect their explanations to their experiences in the previous phases, while providing scientific terms and explanations.

The remaining phases of the 5E Instructional Model require students to apply their understanding of academic content. Elaboration, the fourth phase, contextualizes academic content. Students are able to experience how academic content is used in the real world. The Elaboration experience facilitates concept transfer to new, but similar situations and provides opportunities for further clarification and gathering of information. During this phase, students interact within groups and have opportunities to express their understandings and provide feedback to others. The Evaluation portion of the model assesses student understanding via formal assessments that may be performance based, objective questions, essays, or other types of summative assessments. Whereas informal formative assessment can be accomplished throughout the previous phases of the model, this phase provides the opportunity for the teacher to determine educational outcomes. Within the final phases, students demonstrate their understanding and present evidence of how they have connected their new knowledge to previously learned experiences (Bybee et al., 2006).

In a report on the 5E Instructional Model prepared for the Office of Science Education of the National Institutes of Health, Bybee et al., (2006) stated:

> The sustained use of an effective, research-based instructional model can help students learn fundamental

Table 2: Descriptive Information for TAKS Science Scale Score for District 5th Graders by Administration Date

Administration Date	Mean	N	Std. Deviation	Std. Error of Mean
April 2005*	2085.40	926	436.151	14.333
April 2006	2147.65	970	323.943	10.401
April 2007	2190.73	973	314.695	10.089
April 2008	2228.71	993	232.531	7.379
April 2009	2309.76	1035	329.596	8.441
Total	2195.14	4897	329.596	4.710

Note: *Baseline

Table 3: 2005 - 2009 District 5th Grade Average TAKS Science Scale Scores by Gender

Group	2005*	2006	2007	2008	2009
Female	2099	2139	2200	2183	2301**
Male	2072	2157	2181	2250	2319

Note: *Baseline
**The average scale scores of ISD students exceeded the state-wide averages.

Table 4: Frequency Information for Ethnicity for District 5th Graders in 2005-2009

	Frequency	Percent	Cumulative Percent
American Indian or Alaskan Native	4	.08	.08
Asian or Pacific Islander	37	.75	.83
African American	1243	25.30	26.13
Hispanic	1961	39.91	66.04
White, not of Hispanic Origin	1669	33.96	100.0
Total	4914	100.00	

> concepts in science and other domains. If we accept that premise, then an instructional model must be effective, supported with relevant research and it must be implemented consistently and widely to have the desired effect on teaching and learning. (p. 1)

Johnson, Kahle, and Fargo (2007) reported that sustained professional development programs have a positive impact on student achievement and suggested this type of program could help narrow achievement gaps in science. In an effort to ensure the consistent implementation of this model so it could realize the desired effect, trainers from Region 4 ESC met with science teachers for professional development on the textbook curricula at the beginning of each six weeks for the first year.

The textbook program includes a teacher edition as well as a student edition. The student edition organizes all lessons in the 5E Model sequence and requires students to keep a journal recording their observations, ideas, data collected, drawings, etc. The appendix to the student edition makes information and scoring rubrics available to the students for the learning strategies used throughout the lessons. The teacher edition, in addition to the pages from the student edition, includes the information needed for implementation of each lesson. This includes materials lists, basic instructions for individual lessons, facilitation questions with answers, additional ideas for implementation, and answer keys for the questions and activities. In addition, a Teacher Resource CD contains handouts and transparency masters, manipulatives, lab station cards, and assessment masters. Assessments include six Curriculum-Based Assessments and one TAKS-Based Assessment.

Instructional strategies used in the textbook program are active and varied, helping students to develop a deeper understanding of concepts. The curriculum facilitates changes in the instructional practice. While the lesson structure is consistently based on the 5E Model, the variety of strategies employed for various purposes helps motivate both teachers and students. Approaches used to activate prior knowledge include brainstorming and mental imagery and teachers are provided with organizational strategies and guidelines for implementation. In order to create learner-centered instruction, strategies such as stations, cooperative learning, lab grouping, read and say something, and think-pair-share are employed. Strategies for organizing information include concept mapping, journaling, Venn diagrams and T-charts. Teachers are also encouraged to use physical models, simulations, and drawings to represent knowledge and processes and for students to make their thinking visible, thereby increasing their understanding.

Data Analyses

In order to address whether 5th grade science scores changed as a result of use of a textbook that utilized the 5E Instructional Model, the district provided TAKS data collected in April 2005, 2006, 2007, 2008, and 2009. Information pertaining to 990 fifth graders in 2005, 1052 fifth graders in 2006, 1098 fifth graders in 2007, 1161 fifth graders in 2008, and 1109 fifth graders in 2009 was obtained. Duplicate data files (repeat 5th graders) in the five data sets and those students who took the Spanish version of the TAKS test were extracted, resulting in final data sets of 928, 981, 983, 993 and 1035, respectively (Table 1). This 5-year data set served as the input for the analyses.

Science Scale Score was used as the dependent variable (DV); the independent variables (IVs) were administration date, gender, and ethnicity. In some of the analyses, the numbers of observations do not match those of the final data set because of missing values in terms of IVs. Because of the large sample sizes, the impact of the missing values was judged to be minimal.

Administration Date

Data were first analyzed in terms of the administration dates. The descriptive portion of the analysis for Administration Date is summarized in Table 2. The average performance of the district 5th grade students increased across the five years. The difference in mean scale score from the base year of 2005 to 2009

Table 5: 2005 - 2009 District 5th Grade Average TAKS Science Scale Scores by Ethnicity

Group	2005*	2006	2007	2008	2009
All	2085	2148	2191	2218	2310
AA	1922	1995	2018	2107	2209
H	2062	2124	2153	2190	2288
W	2229	2273	2350	2345	2421

Note: AA = African American; H = Hispanic; W = White.
*Baseline

Table 6: 2005 - 2009 State and District 5th Grade Average TAKS Science Scale Scores by Ethnicity

	2005*		2006		2007		2008		2009	
Group	State	ISD	State	ISD	State	ISD	State	ISD	State	ISD
All	2176	2085	2202	2148	2221	2191	2280	2218	2322	2310
AA	2071	1922	2109	1995	2159	2018	2187	2107	2234	2209
H	2114	2062	2152	2124	2230	2153	2230	2190	2270	2288**
W	2270	2229	2285	2273	2341	2350*	2368	2345	2414	2421**

Note: AA = African American; H = Hispanic; W = White.
*Baseline
**The average scale scores of district students exceeded the state-wide averages.

Table 7: Summary ANOVA for District 5th Grade TAKS Science Scale Score for Administration Date, Gender and Ethnicity

Dependent Variable: TAKS Science Scale Score

Source	Type III Sum of Squares	df	Mean Square	F	p	Partial Eta Squared
AdminDate	30022203.3	4	7505550.839	82.450	.001*	.064
Gender	96239.399	1	96239.399	1.057	.304	.001
Ethnicity	53608863.6	2	2.6805E7	294.452	.001*	.109
AdminDate x Gender	913655.655	4	228413.914	2.509	.040*	.002
AdminDate x Ethnicity	1548520.778	8	193565.097	2.126	.030*	.004
Gender x Ethnicity	1424261.087	2	712130.544	7.823	.001*	.003
AdminDate x Gender x Ethnicity	742249.483	8	92781.185	1.019	.419	.002
Error	439319010.556	4826	91031.705			

Note: Adjusted R Squared = .162
American Indian or Alaskan Native and Asian or Pacific Islander were not included in this analysis.
* Significant @ $p \leq .05$

represents an increase of 224, translating to a 10.8% increase. The results of the post hoc test indicate there were statistically significant differences among the administration dates. This result suggests 5th grade students who received science instruction via the texts in 2006-2009 outperformed 5th grade students who received science instruction without the texts in 2005. The average performances of the 2006-2009 5th graders were significantly different from each other. Direct cause and effect cannot be applied to these differences because the science abilities of the four groups could have been different before the intervention of the project. However, implementation of the texts contributed to increased student achievement.

Gender

For the years 2005-2009, the average performance of females and males was very similar (Table 3), indicating no gender bias in the TAKS Science Scale Scores of the district 5th graders. Except for the slight decline for females from 2007 to 2008, both groups demonstrated improved performance across the time periods. District 5th grade females experienced a 9.62% increase from the base year of 2005 to 2009. The 5th grade male students achieved an 11.92% increase during the same time span.

Ethnicity

Analysis of the means by ethnicity revealed an observable achievement gap for three ethnic groups. The descriptive information and the percentages of the various ethnic groups are displayed in Table 4. Among district 5th graders examined in the years 2005 to 2009, the majority of students were Hispanic (1,961), followed by Whites (1,699) and African Americans (1,243). These three ethnic groups comprised over 99% of the students in the 5th grade. Since the numbers of students in the ethnicity categories of American Indian or Alaskan Native and Asian or Pacific Islander were too small to warrant statistical inference, these two groups were not included in the subsequent analysis of variance (ANOVA) tests involving ethnicity. The achievement gap for the three analyzed ethnic groups may be seen in Table 5.

The science scale score averages for the three major ethnic groups rose over the five-year study for both the state and district (Table 6). The district's African American students' average scores increased by 287 points (14.93%) while Texas African American students' average scores increased by 163 points (7.87%). In the same time span, district Hispanic students' average scores increased by 226 points (10.96%) and the scores of their counterparts in the state increased by 156 points (7.38%). District White students' average scores increased by 192 points (8.61%) and Texas White students' average scores increased by 144 points (6.34%).

ANOVA

Differences in group means were analyzed using a between groups 5×2×3 (Administration Date × Gender × Ethnicity) ANOVA. A summary of the ANOVA results is presented in Table 7. There was not a significant 3-way interaction of the IVs. Significant 2-way interactions were obtained between Administration Date and Gender, between Administration Date and Ethnicity, and between Gender and Ethnicity. The main effects for Administration Date and Ethnicity were both significant and were probed because the effect sizes associated with the significant 2-way interactions were all judged to be extremely small.

Since the 2-way interactions were not explored, we examined main effects using Ryan-Einot-Gabriel-Welsch F test. The results of the post hoc test indicate that there were statistically significant differences among the administration dates (Table 8). This result suggests that the average Science Scale Score of 5th grade students who received science instruction with the 5E-based textbook in 2006-2009 outperformed 5th grade students who received science instruction with a more traditional textbook and curricular model in 2005 (baseline). The average performances of the

Table 8: Post Hoc Results for Administration Date for BISD 5th Grade TAKS Science Scale Score Ryan-Einot-Gabriel-Welsch F

		Subset				
Administration Date	N	1	2	3	4	5
April 2005*	919	2085.06				
April 2006	962		2146.43			
April 2007	963			2188.21		
April 2008	988				2281.41	
April 2009	1024					2309.83

Note. Means for groups in homogenous subsets are displayed.
*Baseline

Table 9: Cross-tabulation of District 5th Grade Administration Date by Percent Met Standard

			Did not meet standard	Did meet standard	Texas students met standards	Total
Admin Date	2005*	Count	362	564		926
		% within Administration Date	39.1%	60.9%	64.0%	100.0%
		% of column total	26.7%	15.9%		18.9%
	2006	Count	292	678		970
		% within Administration Date	30.1%	69.9%	75.0%	100.0%
		% of column total	21.5%	19.1%		19.8%
	2007	Count	293	680		973
		% within Administration Date	30.1%	69.9%	77.0%	100.0%
		% of column total	21.6%	19.2%		19.9%
	2008	Count	238	755		993
		% within Administration Date	24.0%	76.0%	81.0%	100.0%
		% of column total	17.6%	21.3%		20.3%
	2009	Count	171	864		1035
		% within Administration Date	16.5%	83.5%	84.0%	100%
		% of column total	12.6%	24.4%		21.1%
Total		Count	1356	3541		4897
		% within Administration Date	27.7%	72.3%		100.0%
		% of column total	100.0%	100.0%		100.0%

Note: *Baseline

2006-2009 5th graders were judged to be significantly different from each other. Direct cause and effect cannot be applied to these differences because the science abilities of the four groups may have been different. However, the cross-sectional longitudinal data may be used to indicate that the 5E Model curriculum has to be considered a major part of the change.

Secondary Analyses for Percent Met Standard

Percent Met Standard by Administration Date

The percent of 5th graders surpassing the panel recommended score of 2100 was calculated for the IV of administration date (Table 9). Since the basis upon which the percentages were calculated changed across time, a comparison between and within years and/or groups needs to be undertaken with caution. The required score to "meet state standards" increased from year-to-year, the number of schools tested year-to-year changed and there was a large influx of Hispanic students over the study period. As may be seen from Table 10, the percent of district 5th grade students who met the state science scale score standard increased from 2005 to 2009.

Percent Met Standard by Gender

The percent met standard analyses were carried out for gender at each of the administration dates. The cross-tabulations summary is presented in Table 10.

Summary

In this fourth-year evaluation of the effectiveness of the Grade 5 science textbook program, the differences in the TAKS Science Scale Scores of 5th grade students in the district for the years of 2005, 2006, 2007, 2008, and 2009 were investigated. The 5th graders in 2005 received science instruction via the state-adopted traditional textbook and the 2006 through 2009 5th graders received science instruction via the Region 4 ESC-designed textbook program. While there were statistically significant differences in the average performance across the five data sets, complete internal validity cannot yet be assigned to the Region 4 ESC-designed textbook program. A comparison of the average performance of the 2006 5th graders when they were retested as 8th graders in 2009 would have provided some insight into the longitudinal effect of Region 4 ESC-designed textbook usage in the district. However, since the TAKS Science tests for these two grades are different in both number of items and difficulty level, such a comparison would need to be viewed with caution and was therefore not presented.

Within this fourth-year data analysis of the district 5th grade students, there is an indication that the science achievement gap between the three major ethnic groups still exists. There is not a gap in terms of gender. The results pertaining to the percent met standard data mirrored the increases seen in terms of science scale score. The base number for White students remained relatively stable across the time periods and the absolute number of White students who met or surpassed the standard increased. This resulted in an increase in percent met standard for this group. Since the base number for Hispanic 5th graders substantially increased and the absolute number of students meeting the standard also increased substantially, this translated into a large change in the percent who met the standard, especially from 2007 to 2008. Since the number of African American students decreased, then increased, and then decreased again, the percent met standard fluctuated in the same pattern for this group.

Table 10: Summary of District 5th Grade Percent Met Standard by Gender

	GENDER		
Adm. Date	Female	Male	Total
2005*	60.2%	61.6%	60.9%
2006	69.1%	70.7%	69.9%
2007	70.3%	69.5%	69.9%
2008	71.9%	79.7%	76.0%
2009	81.5%	85.4%	83.5%
Change in Percent 2005-2009	21.3%	23.8%	22.6%

Note. *Baseline

Conclusions

Due to lack of access to the state database and removing repeaters and Spanish test takers, as was done with students in this study, statistical comparisons cannot be made. It should be noted that the usual effect of repeat examinations results in higher scale scores.

Table 11: Differences between District 5th Grade and State 5th Grade Average TAKS Science Scale Scores by Ethnicity

	ETHNICITY											
	African American			Hispanic			White			Entire Population		
Yr.	ISD	TX Avg.	Diff.	ISD	TX Avg.	Diff.	ISD	TX Avg.	Diff.	ISD	TX Avg.	Diff.
'05*	1922	2071	-149	2062	2114	-52	2229	2270	-41	2085	2176	-91
'06	1995	2109	-114	2124	2152	-28	2273	2285	-12	2148	2202	-54
'07	2018	2159	-141	2153	2230	-77	2350[&]	2341	+9	2191	2221	-30
'08	2107	2187	-80	2190	2230	-40	2345	2368	-23	2218	2280	-62
'09	2209	2234	-25	2288[&]	2270	+18	2421[&]	2414	+7	2310	2322	-12

Note: *Baseline
[&]The average scale scores of district students exceeded the state-wide averages.

The percent change of scale scores for all groups examined rose higher for district students than their state counterparts (Table 11 and Table 12). Admittedly, state scores were initially higher in the baseline year and a capping phenomenon likely occurred. The average scale score for all students, African Americans and males were higher for all Texas students compared to district students. This was true in the baseline of the study in 2005 and remained so throughout the following five years. However, Hispanics, Whites and females from the district, all of whom had lower average scale scores than their counterparts at the state level in 2005, outscored them by the end of the study.

Achievement gaps between African Americans and Whites and Hispanics and Whites were analyzed. In the baseline year (2005), achievement gaps in the district were 1.54 - 1.07 times higher than the state achievement gaps for African Americans and Hispanics, in terms of scale score (Table 6). At the close of the study, the district African American achievement gap was still higher than the state average. However, the gap had been reduced by 31.0% over 4 years in the district and the respective gap for the state had been reduced only by 9.5%. The Hispanic achievement gap for the district students was reduced by 20.4% over the study as compared to 7.7% in the state. It is also important to note that the Hispanics in the district had a lower achievement gap (133 points) compared to their White counterparts than did Texas students (144 points).

The final comparisons were conducted to examine the percentage of students who met the state standard of proficiency, deemed to be a scale score of 2100 points. All groups examined showed an increase in the average number of students meeting the minimum standard (Table 13). A close examination reveals the district and state students meeting standards rose approximately at the same rate based on baseline and final data results.

Discussion

The curriculum based on the 5E model showed promise for some groups that have been less successful in science and historically underrepresented in the science, technology, engineering and mathematics (STEM) professions, namely Hispanics and females. Comments from teachers and science specialists in the district about the first draft of the text commented on its merit, but also suggested novice teachers struggled with implementation. There were not enough examples for teachers who lacked content knowledge or were new to the classroom. A limitation of this study was that teachers at the respective schools changed over time and new teachers did not receive the same amount of training in the use of the 5E Model. With this feedback and due to updated state standards, the Region 4 ESC has now written a newer edition. Also, it is difficult, if not impossible to determine the consistency and level of adoption and implementation of the text and principles throughout the district. While the persistent achievement gap among African Americans is troubling, the fact that approximately 74% of the population of the district (Hispanic and Whites) overtook their

Table 12: Differences between District 5th Grade and State 5th Grade Average TAKS Science Scale Scores by Gender

	GENDER								
	Male			Female			Entire Population		
	ISD	TX Avg.	Diff.	ISD	TX Avg.	Diff.	ISD	TX Avg.	Diff.
'05*	2072	2198	-126	2099	2154	-55	2085	2176	-91
'06	2157	2220	-63	2139	2184	-45	2148	2202	-54
'07	2181	2297	-116	2200	2246	-46	2191	2221	-30
'08	2250	2311	-61	2183	2250	-67	2218	2280	-62
'09	2319	2353	-34	2301[&]	2229	+72	2310	2322	-12

Note: *Baseline
[&]The average scale scores of district students exceeded the state-wide averages.

Table 13: Difference between District 5th Grade Percent Met Standard and State 5th Grade Percent Met Standard by Ethnicity

	ETHNICITY									
	African American			Hispanic			White			Total Percent
Adm. Date	District	State Average	Difference	District	State Average	Difference	District	State Average	Difference	Passing
'05*	42.0%	46.0%	-4.0%	57.1%	54.0%	+3.1%	78.4%	79.0%	-0.6%	60.9%
'06	48.7%	59.0%	-10.3%	64.1%	67.0%	-2.9%	89.0%	88.0%	+1.0%	69.5%
'07	47.4%	64.0%	-16.6%	64.7%	70.0%	-5.3%	91.0%	90.0%	+1.0%	69.9%
'08	60.8%	69.0%	-8.2%	73.0%	76.0%	-3.0%	91.7%	91.0%	+0.7%	76.0%
'09	70.8%	75.0%	-4.2%	83.4%	80.0%	+3.4%	94.1%	93.0%	+1.1%	83.5%
Chg. '05-'09	28.8%	29.0%	-.2%	26.3%	26.0%	+.3%	15.7%	14.0%	+1.7%	22.6%

Note: Total includes American Indian or Alaskan Native and Asian or Pacific Islander.
*Baseline

state counterparts over the 4 year study is a powerful testimony to the efficacy of the text incorporating the 5E model in student engagement and learning in a high stakes test environment.

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