



# RESEARCH

Educational Program Report

EVALUATION BRIEFS  
VOLUME 8, ISSUE 1,  
2013 - 2014



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# EVALUATION REPORT

BUREAU OF PROGRAM EVALUATION

Volume 8, Issue 1, May 2014

## *The effect of the New Digital Energy game on science interests, attitudes, and knowledge, 2013–2014*

By Venita Holmes, Dr.P.H.

*During the 2013–2014 academic year, 647 elementary, middle, and high-school students participated in the New Digital Energy Game (NDE) game in the Houston Independent School District (HISD). This is the fourth year that NDE has been implemented in HISD. The game was designed to enrich students' science experiences in order to stimulate their interests to pursue science energy careers. The game was funded by Chevron Corporation and developed by Tietronix, Inc. Paired t-test analysis yielded a sample of 382 elementary (28%), middle (61%), and high (11%) school students. Based on a 4-point Likert-type scale, the majority of students at each level indicated either no change or a slight to moderate positive change in their science interests and attitudes from pre- to post-tests. The majority of elementary, middle, and high-school students showed a loss in their science knowledge assessment scores, comparing before and after game participation results. There was a positive relationship between post-interests in science and post-attitudes about science following game participation. Propensity score, nearest neighbor matching yielded slightly lower 2014 Stanford 10 science performance of NDE students compared to a similar student group, suggesting no positive benefit of the game using this measure.*

### **Background**

Much attention has been devoted toward understanding computer games and their educational benefits to students. Computer games that provide instruction have the potential to stimulate the academic environment and increase students' awareness and knowledge of phenomenon to solve problems (Honey & Hilton, 2010; Jones, 1996; Mundie, 2011; Owston, 2009; Yang, Kun, & Chein, 2010). "Electronic gaming may be one way to engage students in critical thinking necessary to apply subject matter to "real-life" experiences" (Curriculum Review, p. 10). Digital games may encourage students to ask unanswered questions and teach them to use problem-solving techniques.

Brendzel (2004) pointed out that "games provide a natural motivation" (p. 32) to apply good teaching strategies to help build science concepts. Contest can further stimulate students' drive to compete, which may improve comprehension in a format that may be interesting to students. Interested students are more engaged in activities

that they value (Bulunuz & Jarret, 2009). Ogunkola (2011) found that increased attitudes and interest in an activity is correlated with good study habits and engagement in school. Disengaged students are more likely to have poor attendance and more likely to drop out of school (Balfanz, Herzog, & Mac Iver, 2006).

The New Digital Energy (NDE) game focused on increasing students' understanding of science energy concepts. Game tasks accommodated all student academic levels by combining strategy, construction, and game management, and requiring that players build energy companies and gain dominant market share to meet the needs of U.S. cities. Students played as teams against artificial intelligence, competing across three levels of difficulty. Variations in difficulty were incorporated into lessons that students had to master to open options within the game. Lessons and questions prompted students to game-play decisions that required understanding of physics, chemistry, earth science, and math concepts.

To that end, this study measured the effects of the NDE game on students' acquisition of science

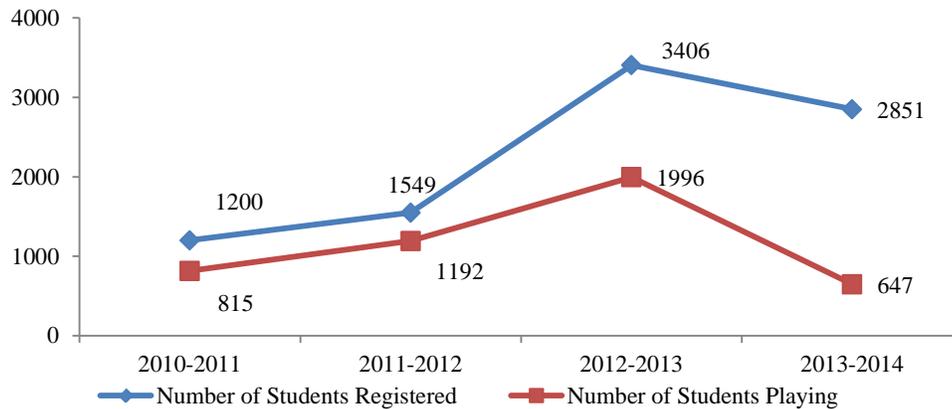


Figure 1. Number of students who registered and played the NDE game, 2010–2011 through 2013–2014

knowledge and science achievement. In addition, the study assessed the effects of the game toward increasing students’ interests and attitudes in science.

**Methods**

*All Study Participants*

All HISD elementary, middle, and high-school science teachers were invited to recruit students to participate in the NDE game during the fall of 2014. Teachers were required to register and sign a letter of commitment to participate. **Figure 1** presents the number of students who registered along with the number of students who played the game over the past four academic years. Twenty-two schools and 29 teachers were represented in the 2012–2013 data; whereas, seven elementary and nine secondary schools (eight middle schools and one high school) were represented in the 2013–2014 data. Students playing the game dropped by 20.6 percent from the 2012–2013 to the 2013–2014 academic year. There was also a drop in registration (-16.3%) and participation (-67.6%), from the previous to the current academic year.

*Student Sample*

The study sample consisted of 107 elementary, 233 secondary, and 41 high school students who completed the four instruments (pre- and post-science energy knowledge assessments along with pre- and post-science interest/attitude surveys). Students in the matched sample were enrolled at seven elementary schools, eight middle schools, and one high school. **Table 1** presents demographic characteristics of the matched student sample. The majority of students were male (between 52.8% and 76.0%) and economically

disadvantaged (between 78.5% and 87.0%). The highest proportion of at-risk students was at the elementary level (58.3%) compared to the lowest percentage at the middle-school level (23.6%) There were nearly twice as many limited English proficient (LEP) students at the elementary level than at the middle-school level (34.3% vs. 17.2%). High-school students were only 4.9% LEP. Comparatively, the District had a higher percentage of at-risk students (68.7%) and a lower percentage of G/T students (15.6%) than the NDE student sample at all levels (PEIMS, 2013–2014).

*Measures and Variables*

Students were administered four web-based surveys accessed at the game site. The instruments included a 10-item science interest survey, a 10-item science attitudes survey, and a 17-item multiple-choice science energy assessment using a pre- and post-test design. The survey items measuring interests and attitudes had good internal consistency, with a Cronbach alpha coefficient of .81 and .86, respectively. While students were encouraged to complete the instruments, no incentives were offered for completion.

Table 1: Profile of NDE Student Sample by School Level, 2014

	Elem (n = 108)	Middle (n = 233)	High (n = 41)	HISD
<b>Gender</b>	%	%	%	%
Male	52.8	76.0	56.1	51.0
Female	47.2	24.0	43.9	49.0
<b>Eco. Disadv.</b>	87.0	78.5	82.1	80.4
<b>At Risk</b>	58.3	23.6	43.9	68.7
<b>G/T</b>	21.3	33.9	31.7	15.6
<b>LEP</b>	34.3	17.2	4.9	29.5
<b>Spec. Ed.</b>	8.3	1.7	0.0	7.7

**Elementary-School Student Sample**

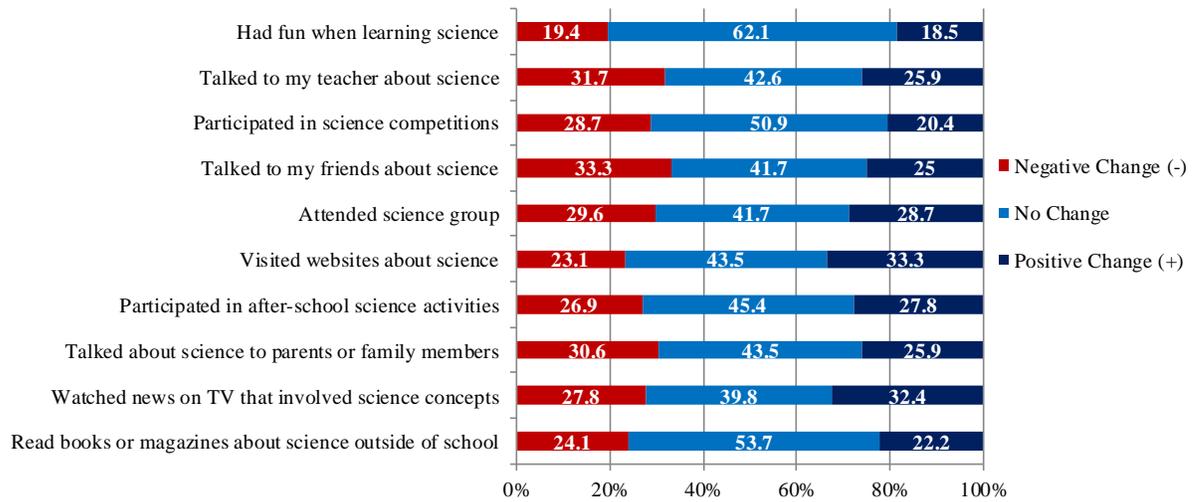


Figure 2: Percentage of elementary-school students whose interest in science ratings before and after participation in NDE showed a positive change (1 to 3 points), no change (0 points), or a negative change (-1 to -3 points) based on 4-point Likert-type scale

Interests were rated using a Likert-type scale: very often-4; regularly-3; sometimes- 2; and never or hardly ever- 1. Attitudes were rated strongly agree- 4; agree-3, disagree-2, and strongly disagree-1.

The percentage of students whose ratings increased by one to three points, did not change, or decreased by one to three points from pre- to post-test was analyzed using IBM SPSS. Comments about students’ experiences were summarized. Descriptive statistics and correlation analysis was conducted between the measures. Propensity score matching was used to estimate the probability of being exposed to treatment given a set of observed variables. Propensity score matching is a common practice in social science to make causal inferences based on observational data (Cohen, 1988). NDE students who were included in the “study sample”

were used in the propensity score matching. Economic status, gender, grade level, special education program status, and current 2014 Stanford reading normal curve equivalent scores were the control variables.

**What was the impact of the NDE game on students’ science interests and attitudes?**

Figure 2 and Table 2 depict interest and attitude survey results of the elementary student sample before and after participation in the NDE game in 2014. The interest items that showed the highest percentage of “positive change” were “visited websites about science” and “watched news on TV that involved science concepts” (33.3% and 32.4%, respectively).

Table 2. Science Attitudes of Elementary-School Student Sample Before and After Participation in the NDE game, 2014

	Positive Change (+)	No Change	Negative Change (-)
	%	%	%
I am interested in learning more science.	20.6	50.5	29.0
Science will help me become successful.	17.1	60.0	22.9
I like studying science.	22.8	56.4	20.8
A science energy game will help me learn difficult science theories that I may not understand without seeing it in the game.	22.4	46.7	30.8
Studying science is worthwhile because it will improve my career opportunities.	23.1	48.1	28.7
Making an effort to study science is worth it because it will help me get into college.	17.8	55.1	27.1
I study science because I know it is useful to me.	11.1	58.3	30.6
I would like to have a career involving science.	21.9	46.7	31.4

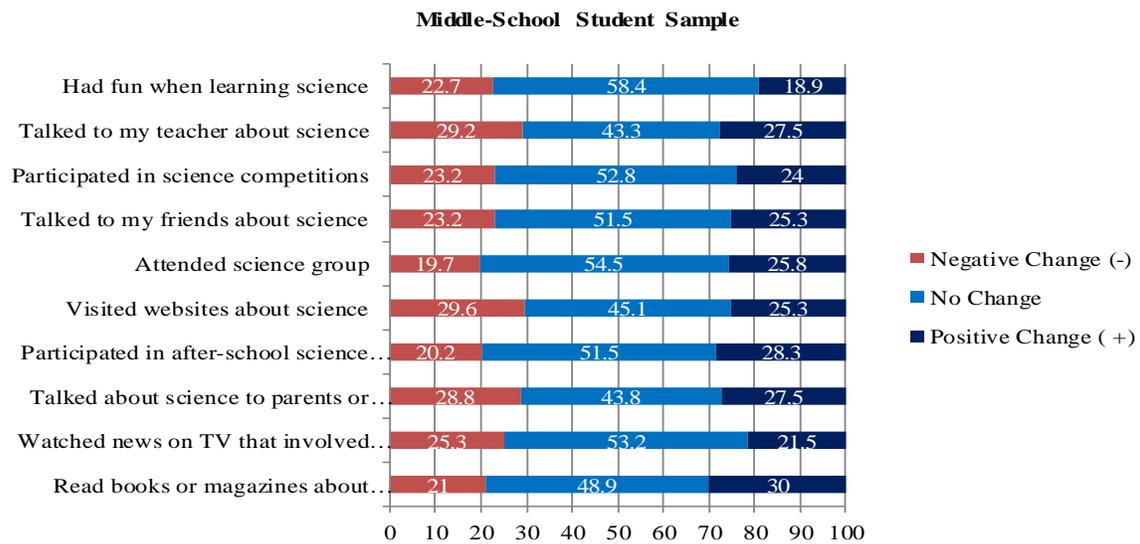


Figure 3: Percentage of middle-school students whose interest in science ratings before and after participation in NDE showed a positive change (1 to 3 points), no change (0 points), or a negative change (-1 to -3 points) based on 4-point Likert-type scale

“No change” was most likely on the item “had fun when learning science” (62.1%). The highest percentage of “negative change” in ratings was on the item “talked to my friends about science”.

Regarding their attitudes about science, the item that reflected the highest percentage of “positive change” was “study science is worthwhile because it will improve my career opportunities” (23.1%). “Science will help me be more successful” showed the highest percentage of “no change” (60.0%); whereas, the item that showed the highest percentage of “negative change” was that “I would like to have a career involving science” (31.4%).

Science interest and attitude results of middle-

school students before and after participation in the game can be found in **Figure 3** and **Table 3**. The science interest item that reflected the highest percentage of “positive change” from pre- to post-test was “reading books or magazines about science outside of school” (30.0%) and “participating in afterschool science activities” (28.3%) (Figure 3).

Relative to attitudes (Table 3), the middle-school students were more likely to express “positive change” on the item “I like studying science” (20.5%). At the same time, the highest percentage of “no change” was on “making an effort to study science is worth it because it will help me get into college” (82.9%).

Table 3. Science Attitudes of Middle-School Student Sample Before and After Participation in the NDE game, 2014

	Positive Change (+)	No Change	Negative Change (-)
	%	%	%
I am interested in learning more science.	14.6	48.8	36.6
Science will help me become successful.	14.6	61.0	24.4
I like studying science.	20.5	51.3	28.2
A science energy game will help me learn difficult science theories that I may not understand without seeing it in the game.	14.6	43.9	41.5
Studying science is worthwhile because it will improve my career opportunities.	10.3	71.8	17.9
Making an effort to study science is worth it because it will help me get into college.	17.1	82.9	31.7
I study science because I know it is useful to me.	12.2	48.8	39.0
I would like to have a career involving science.	10.0	57.5	32.5

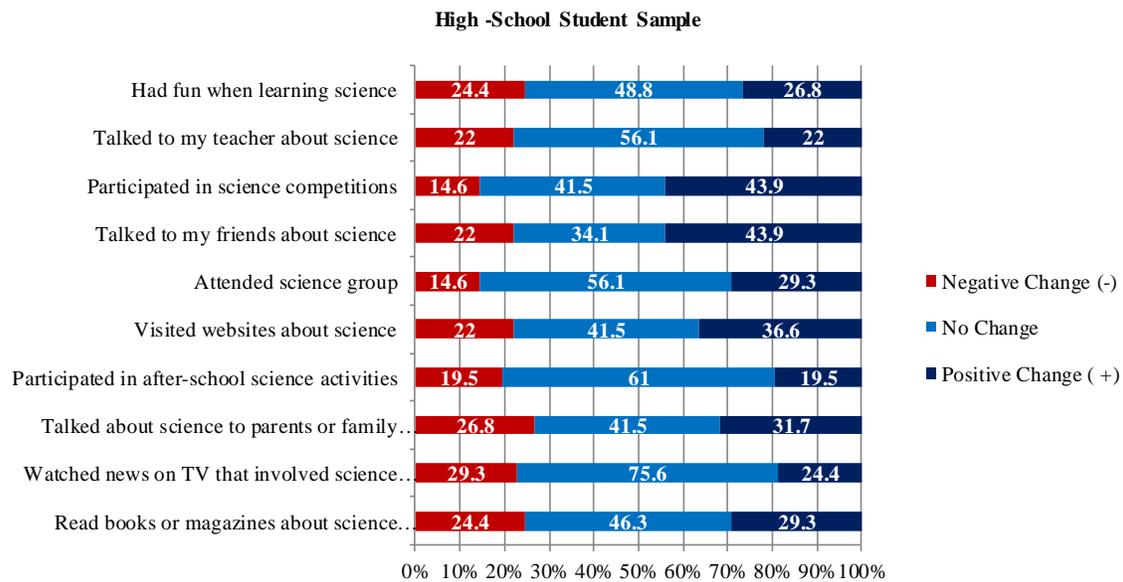


Figure 4: Percentage of high-school students whose interest in science ratings before and after participation in NDE showed a positive change (1 to 3 points), no change (0 points), or a negative change (-1 to -3 points) based on 4-point Likert-type scale

“Negative change” was most evident on “a science energy game will help me learn difficult science theories that I may not understand without seeing it in the game” (41.5%).

The results of the high-school student sample regarding their interests and attitudes about science are shown in **Figure 4** and **Table 4**, respectively. The science interest item that showed the highest percentage of “positive change” was “participated in science competitions” and “talked to my friends about science” (43.9%). “No change” was most evident on the item “watched news on TV that involved science concepts” (75.6%). “Negative change” was also more likely on this item (29.3%) (Figure 4).

“Positive change” in attitudes about science for high-school students was highest on the item “I study science because I know it is useful to me” (27.1%) (Table 4). The highest percentage of students expressed “no change” on the item that “making an effort to study science is worth it because it will help me get into college (59.4%). At the same time, the highest percentage of “negative change” was reflected on “a science energy game will help me learn difficult science theories that I may not understand without seeing it in the game” (32.6%).

Table 4. Science Attitudes of High-School Student Sample Before and After Participation in the NDE game, 2014

	Positive Change (+)	No Change	Negative Change (-)
	%	%	%
I am interested in learning more science.	22.3	48.1	29.6
Science will help me become successful.	24.7	53.7	21.6
I like studying science.	24.2	54.3	21.5
A science energy game will help me learn difficult science theories that I may not understand without seeing it in the game.	23.5	43.9	32.6
Studying science is worthwhile because it will improve my career opportunities.	22.0	50.4	27.6
Making an effort to study science is worth it because it will help me get into college.	16.6	59.4	24.0
I study science because I know it is useful to me.	27.1	46.3	26.6
I would like to have a career involving science.	20.6	53.9	25.4

Table 5. Science Knowledge Assessment Raw Score Results of the Student Sample Before and After Participation in the NDE game, 2014

	Gain (+)					Loss (-)					No Diff.	
	Raw Score					Raw Score						
	n	%	Min	Max	Mean	n	%	Min	Max	Mean	n	%
Elementary (n=108)	31	28.7	5.9	29.4	10.6	66	61.1	5.9	47.1	16.4	11	10.2
Middle (n=233)	89	38.2	5.9	41.2	13.8	100	42.9	5.9	52.9	13.2	44	18.9
High (n=41)	11	26.8	5.9	17.7	10.7	26	63.4	5.9	52.9	17.9	4	9.8
Total (n=382)	131	34.3	5.9	41.2	12.8	192	50.3	5.9	52.9	15.0	59	15.4

**What was the effect of the NDE game on students’ science knowledge?**

Table 5 shows the mean “gain”, “loss”, and “no difference” in the science knowledge raw scores from pre- to post-assessment of the student sample. The minimum and maximum number of points that students gained or lost along with the number and percentage of students who had gains, losses, and showed no difference in their science knowledge assessment raw scores from pre- to post-assessment are presented.

Middle school students achieved the highest mean “gain” in their raw score on the knowledge assessment (13.8 points). Elementary and high-school students attained comparable gains in their raw scores (10.6 and 10.7 points, respectively). High-school students attained the highest mean “loss” in their raw score on the assessment over time. The highest percentage of the middle-school student sample had “no difference” in their science assessment raw score before and after participation in the game. Over two-thirds of the high and elementary-school students showed either a loss or no change on the assessment. Only one-third of the

students overall showed any gain in their knowledge assessment raw score.

**What were the associations between science interests, attitudes, and science assessment results before and after participation in the NDE game?**

Table 6 depicts means and standard deviations along with intercorrelations of the measures for the elementary-school student sample. There were slight decreases in their mean interest (-.08) and attitude ratings (-.13) as well as a moderate decrease in their mean science knowledge assessment scores (-6.97 points) from pre- to posttest. Other notable findings included a positive association between elementary-school students’ post-interests, post-attitudes, and post-science knowledge assessment results. In other words, as elementary students’ interests in science increased, their attitudes and science knowledge assessment scores increased after participation in the game. Pre- and post-attitudes as well as pre-knowledge intercorrelations with post-knowledge were highly statistically significant at  $p < .01$ .

Table 6, Summary of Intercorrelations, Means, and Standard Deviations for Scores on the Pre- and Post-Science Interest, Attitude, and Knowledge Measures for the Elementary Student Sample, 2014

	1	2	3	4	5	6
1. Pre-Interest	-	.622**	.560**	.390**	-.048	.006
2. Post-Interest	.622**	-	.520**	.656**	.100	.120
3. Pre-Attitude	.560**	.520**	-	.628**	.113	.292**
4. Post-Attitude	.390**	.656**	.628**	-	.176	.311**
5. Pre-Knowledge	-.048	.100	.113	.176	-	.625**
6. Post-Knowledge	.006	.120	.292**	.311**	.625**	-
M	2.66	2.58	3.10	2.97	45.10	38.13
SD	.58	.65	.63	.68	15.98	18.11

\*\* $p < .01$

Table 7. Summary of Intercorrelations, Means, and Standard Deviations for Scores on the Pre- and Post-Science Interest, Attitude, and Knowledge Measures for the Middle-School Student Sample, 2014

	1	2	3	4	5	6
1. Pre-Interest	-	.595**	.525**	.403**	.030	.020
2. Post-Interest	.595**	-	.456**	.629**	-.011	.042
3. Pre-Attitude	.525**	.456**	-	.568**	.072	.037
4. Post-Attitude	.403**	.629**	.568**	-	.082	.110
5. Pre-Knowledge	.030	-.011	.072	.082	-	.690**
6. Post-Knowledge	.020	.042	.037	.110	.690**	-
M	2.37	2.41	3.00	2.90	56.22	55.79
SD	.56	.59	.67	.77	17.10	18.95

\*\*p &lt; .01

Table 8. Summary of Intercorrelations, Means, and Standard Deviations for Scores on the Pre- and Post-Science Interest, Attitude, and Knowledge Measures for the High-School Student Sample, 2014

	1	2	3	4	5	6
1. Pre-Interest	-	.409**	.371*	.232	.299	.235
2. Post-Interest	.409**	-	.309*	.314*	.113	-.154
3. Pre-Attitude	.371*	.309*	-	.501**	.074	.063
4. Post-Attitude	.232	.314*	.501**	-	.099	.210
5. Pre-Knowledge	.299	.113	.074	.099	-	.677**
6. Post-Knowledge	.235	-.154	.063	.210	.677**	-
M	2.63	2.76	3.11	2.82	65.14	56.67
SD	.64	.63	.63	.67	18.62	23.00

\*p &lt; .05; \*\*p &lt; .01

Middle-school students' results can be found in **Table 7**. There was a slight increase in their mean interests rating (+.04) from pre- to post-survey. However, there were slight decreases in their mean attitudes rating (-.10) and mean science knowledge assessment score over the same time period (-.43 points). Regarding the post-survey measures, as post-interests in science increased ( $p < .01$ ), post-attitudes ( $p < .01$ ), and post-science knowledge increased.

Data on high-school students is shown in **Table 8**. The mean interests rating increased slightly (+.13) from pre- to post-test, while the mean attitudes rating decreased (-.29) over the same time period. There was a moderate decrease in students' mean science knowledge assessment score (-8.47) before and after participation in the game. As post-interests in science increased ( $p < .05$ ), post-attitudes increased ( $p < .05$ ), and post-science knowledge decreased.

### What was the effect of the NDE game on science achievement?

Propensity score, nearest neighbor matching was used to determine the effect of the NDE program on students' 2014 Stanford science NCE scores (See **Appendix A**). The statistical model used in the analysis controlled for economic status, grade level, gender, special education program status, and 2014 Stanford 10 reading NCE scores. Bias analysis was conducted and yielded a comparison sample where the treated and untreated shared the same characteristics, which means that the selection bias had been mitigated in the "new" sample (Austin, Grootendorst, and Anderson, 2007). Out of the 272 NDE students in the initial sample, *Stata* selected 270 students for the model. Out of the 53,627 students in the comparison group, *Stata* selected 52,404 students for the model. Prior to controlling for these variables, the

NDE students had a higher science score than the control group (58.1 vs. 52.6 NCEs). Propensity score matching yielded slightly lower science performance due to participation in the program compared to students who did not participate in the program (-1.3 NCEs). Although the difference was not statistically significant, the model suggested that the NDE program did not have a positive effect on students' Stanford science NCE scores.

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## Discussion

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The New Digital Energy game was designed to increase student's understanding of science energy concepts by introducing game construction and management strategies. Students worked as teams to build energy companies, gain dominant market share, and meet the needs of cities throughout the United States. Students played against artificial intelligence to answer challenging questions about science energy. An objective of the game was to increase students' interests and attitudes about science as they increased their knowledge of science energy concepts.

There were several limitations to the study. First, given the team format, the study lacked data on actual time spent by individual students playing the game. This could have affected students' experiences gaining science energy knowledge and influenced their interests and attitudes about science at post-test. Another limitation was the lack of a comparison group to assess the impact of the game on students' interests and attitudes. While a pre- post-test design provided an alternative method for comparing students, threats to validity could still exist relative to knowing whether other external factors influenced the changes in student outcomes over time (Boyd, 2002). In consideration of these threats, propensity score matching was used to reduce bias and assess whether participation in the game had an effect on students' science achievement while controlling for key demographic characteristics. No benefit was observed in student's science performance on the 2014 Stanford 10 achievement test. Finally, the lack of data at the four data collection points on all students who played the game resulted in substantial attrition. (The number of students who played the game was substantially lower than the number of students who initially registered (647 out of 2851 students). Even less students were included in the final analysis of the data (382). The recruitment process relied on teacher commitment, which may have contributed to attrition of the initial group of student participants.

The majority of elementary, middle, and high-school students showed either no change or a slight to moderate positive change in their science interests and attitudes from pre- to post-tests. Moreover, the majority of students at all levels had a loss in their science knowledge assessment scores over the same time period. Among the most notable positive findings were as students' interests in science increased after participation in the game, their attitudes about science also increased after the game. Also, there was a positive association between elementary and middle-school students' post-interests in science and post-science knowledge. However, for high-school students, as post-interests increased, post-science knowledge decreased. This finding seems inconsistent with the expectation that a positive relationship should exist between interests and achievement (Brendzel, 2004). Moreover, previous year results were consistently positive (Holmes, 2013). While each year, a different student sample may have participated in the program, a recommendation is to further explore students' perceptions about the game in more detail. This could be done through focus groups or one-on-one interviews with students who have participated in the game over the past four years. Information gathered from students could be incorporated in future game development. Another recommendation is to reconsider strategies on successful recruitment of science teachers and students from more HISD schools. Finally, while evidence of improvements in students' science knowledge was not evident in this study, what may be more important is that students were exposed to science material needed to enhance their understanding of science concepts (Wainwright & Linebarger, 2006). These experiences may be valuable to students who, otherwise, could not afford them.

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**Appendix A**

**Propensity Score Matching Results**

	<b>Treated (n = 270)</b>	<b>Controls (52,404)</b>			
	<b>Mean Science NCE</b>	<b>Mean Science NCE</b>	<b>Difference</b>	<b>S.E.</b>	<b>T-stat</b>
<b>Unmatched</b>	<b>58.1</b>	<b>52.6</b>	<b>55.6</b>	<b>13.93</b>	<b>3.99</b>
<b>Matched</b>	<b>58.1</b>	<b>59.4</b>	<b>-13.1</b>	<b>18.11</b>	<b>-.072</b>



# EVALUATION REPORT

BUREAU OF PROGRAM EVALUATION

Volume 8, Issue 1, August 2014

## ***A Pilot Study of the Stacy and Bo Porter S.E.L.F. Foundation Afterschool Program Effects on Student Performance at Key Middle School, 2013–2014***

**By Venita Holmes, Dr.P.H.**

*During the 2013–2014 academic year, the S.E.L.F. Foundation engaged 32 predominately at-risk students at Key Middle School (KMS) in afterschool tutorials and enrichment activities to support their academic, social, and emotional development. Outcome measures consisted of reading and mathematics performance before and after program implementation. In addition, student perceptions regarding program benefits were gathered via surveys. Combined passing rates for sixth through eighth grade students improved on both the STAAR reading and mathematics assessments by three and six percentage points, respectively from 2013 to 2014, although grade-level performance varied. Sixth, seventh, and eighth-grade program students outperformed all KMS student groups in mathematics on STAAR. Paired t-test analysis showed increases in STAAR scale scores for sixth and seventh-grade program students in reading, statistically significant increases in scale scores for six and eighth-grade program students in mathematics, and decreases in other areas. An overwhelming majority of students indicated that they were benefitting from all of the program components, with the largest majority specifying physical activities (100%) and tutorials (96%). Although still prevalent, overall discipline rates decreased, while differences in rates of unexcused absences for program students before compared to during the program were lower for 28% of students, and increased for 50% of the students. Consideration should be given to expand program components where students expressed benefits (e.g., physical activities), while incorporating interests (e.g., goal setting), needs (school safety), character-building activities (e.g., confidence to do well in school), and behavioral supports to assist with discipline and school attendance.*

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### **Background**

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The Stacy and Bo Porter S.E.L.F. (Sports, Education, Life-Skills, and Faith) Foundation collaborated with the Houston Independent School District (HISD) beginning in the 2013–2014 academic year to implement a pilot afterschool program at Key Middle School. The foundation was established in 2012 by Bo Porter, Houston Astros manager, and his wife Stacy, to provide mentoring and coaching for youth. At Key Middle School, the S.E.L.F. Foundation offered a broad array of academic and enrichment activities, including tutorial assistance, life skills development, sports, spiritual enrichment, and field trips. Guest speakers were an integral part of the program, focusing on character and self-esteem building activities. Inspirational messages were communicated to students by Stacy and Bo Porter through personal campus visits throughout the year. Students were provided dinner at

the end of each day of the program. The program operated on Monday through Thursday throughout the regular school year and during the summer as of February 17, 2014.

Additional enrichment activities designed to complement and enhance students' social and emotional development, and motivate them to succeed in school and in life were offered during the regular academic year or planned to be offered after the end of the regular school year. These activities include flag football with professional athletes and coaches for sixth-grade students (fall 2014); club baseball, with the support and resources for students to pursue their athletic interests (spring 2015). "Day at the Ballpark" was offered in 2014 and exposed students to Houston Astros experiences, where they watched a baseball game, observed batting practice, met, and talked to players and Houston Astros staff. The Summer Bridge Program (summer 2014) will be facilitated by certified HISD teachers and S.E.L.F.

volunteers, to prepare eighth-grade students for transition to high school. During the Summer Bridge Program, students will receive breakfast and lunch. There are future plans to improve campus facilities. There are also plans to expand the S.E.L.F. afterschool program to two additional middle schools during the 2014–2015 academic year.

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## Review of the Literature

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There are contrasting views regarding the impact of afterschool programs on students' growth and development. Many educators believe that afterschool programs are vital to ensure that children are safe, while providing opportunities for them to engage in academically and socially-enriching activities that support parents during out-of-school hours (U.S. Department of Justice, 2001; Afterschool Alliance, 2013). A meta-analysis of 68 afterschool studies found that students participating in high-quality afterschool programs went to school more, behaved better, received better grades and performed better on tests compared to non-participants (Durlak, Weissberg, & Pachan, 2010). Research on nearly 3,000 low-income students at 35 high-quality afterschool programs across the United States found that students who regularly attended afterschool programs, compared to their routinely unsupervised peers, made significant gains in their standardized math test scores; experienced reductions in teacher-reported misconduct, and reduced drug and alcohol use over two years (Vandell, et. al., 2007). Further, after controlling for baseline obesity, poverty, race and ethnicity, the prevalence of obesity was significantly lower for afterschool program participants compared to non-participants (Mahoney, et. al., 2005).

The U.S. Department of Education (2014) funds afterschool programs through 21st Century Community Learning Centers to support education and enrichment, specifically for students who attend high-poverty and low-performing schools. A report released in 2004 found that academic test scores of student participants were no better than scores of students not involved in the programs and, in some cases, behavior appeared to worsen (Ed Week, 2004).

While trends have varied relative to the impact of afterschool programs on students' academic, social, and emotional development, an in-depth examination of specific program activities among targeted student populations is needed to clearly understand which programs work, for whom, and under what circumstances. To that end, this report is designed to explore factors, found in the literature, to impact afterschool program participation, including students' academic performance, school attendance, and

discipline. The report also offers insight concerning which components students considered beneficial toward enhancing their social and emotional growth and development, as well as their perceptions relative to safety, education, and developmental assets.

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## Methods

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### Measures and Variables

Academic achievement of Key S.E.L.F. Foundation students was measured quantitatively using their passing rates on the State of Texas Assessments of Academic Readiness (STAAR) reading and mathematics tests (first test administration). The STAAR is aligned with the state curriculum standards, the Texas Essential Knowledge and Skills (TEKS). The standards are designed to prepare students for postsecondary education and to ensure that they are competitive with other students both nationally and internationally (TEA, 2010). The passing rates of program students on the STAAR reading and mathematics tests were compared to the performance of all students at KMS in comparable grade levels. In addition, a paired t-test analysis, based on STAAR scale scores, was conducted as a pre-posttest measure to determine whether there were significant differences in the reading and mathematics performance of program students who were administered the tests in 2013 (pretest) compared to 2014 (posttest). Student discipline was based on the number of in-school and out-of-school suspensions before compared to during the program (Chancery). Attendance was based on program students' unexcused absenteeism rates retrieved from the data warehouse. Unexcused absences were measured by dividing the number of unexcused absences for each student by all unexcused absences for all program students before and during the program. Differences in the percentages were calculated. The differences represented decreases, no change, or increases in unexcused absences during the two time periods.

Qualitative analysis was also conducted based on a paper-and-pencil survey that was administered to Key S.E.L.F. Foundation students in May 2014. Survey components measured students' perceptions relative to: (1) safety, education, and developmental assets (17 items) (SEARCH Institute, 2014); (2) benefits of specific program components (5 items), and (3) assessment of students' social and emotional interests and needs (19 items). Finally, S.E.L.F. students were asked to express their feelings about the program in an open-ended question format. A total of 30 out of the 32 program students completed the survey, yielding a 94% survey participation rate.

**Data Analysis**

Descriptive statistics, including means, standard deviations, and proportions, were calculated based on students’ STAAR results and responses to survey items using IBM SPSS software. Paired sample t-test analysis was conducted using STAAR scale scores. Scale scores allow direct comparisons of student performance between specific sets of test questions from different test administrations (Texas Education Agency, 2014).

**Student Sample**

A profile of S.E.L.F. Foundation students at Key Middle School during the 2013–2014 academic year is presented in **Table 1**. The students were more likely to be African American (72%), male (69%), economically disadvantaged (94%), and at risk (69%). In addition, a higher proportion of sixth-grade students (44%) participated in the program compared to seventh (25%) and eighth-grade students (31%). Key Middle School S.E.L.F. Foundation students were fairly representative of the general student population at Key Middle School during the 2013–2014 academic year.

Table 1: Demographic Characteristics of Key S.E.L.F. Students Compared to All Key Students, 2013-2014

	S.E.L.F.		All Key	
	N	%	N	%
<b>Gender</b>				
Male	22	69	347	53
Female	10	31	307	47
<b>Ethnicity</b>				
African Am.	23	72	443	68
Hispanic	6	19	193	30
White	1	3	17	2
Al	2	9	4	<1
<b>Grade Level</b>				
Sixth	14	44	239	37
Seventh	8	25	201	31
Eighth	10	31	214	33
<b>LEP</b>	1	3		
<b>Program</b>				
Special Ed.	5	16	101	15
G/T	1	3	11	2
<b>Eco. Disadv.</b>	30	94	609	93
<b>At Risk</b>	22	69	441	67

**What was the performance of S.E.L.F. Foundation students on the STAAR reading and mathematics assessments?**

Passing rates defined as Level II Satisfactory performance at the phase-in I standard on the STAAR reading and mathematics tests are presented in **Figures 1** and **2**, respectively. (Number of students tested is presented in **Table 2**.) The 2013 passing rates reflect students’ performance before program

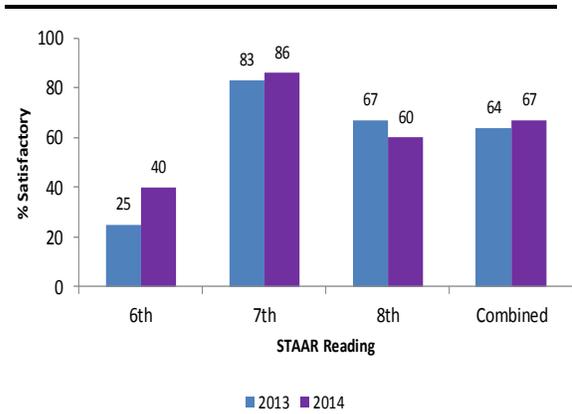


Figure 1. STAAR reading results of S.E.L.F. students before and after S.E.L.F. program participation (2013 vs. 2014).

participation, while the 2014 passing rates represent their performance after program participation. The passing rates are for the paired student groups. The sixth-grade students’ passing rate dramatically increased over the two-year period by 15 percentage points (Figure 1). There was a modest increase in the passing rate of seventh-grade students by two percentage points. However, the reading results of eighth-grade students dropped by seven percentage points. An overall increase of three percentage points was noted in the combined reading performance of program students.

On the STAAR mathematics assessment, for paired student groups, the passing rate of sixth-grade students reflected a sharp increase by 25 percentage points; whereas, seventh and eighth-grade students’ passing rates on the assessment decreased by 25 and 7 percentage points, respectively (Figure 2).

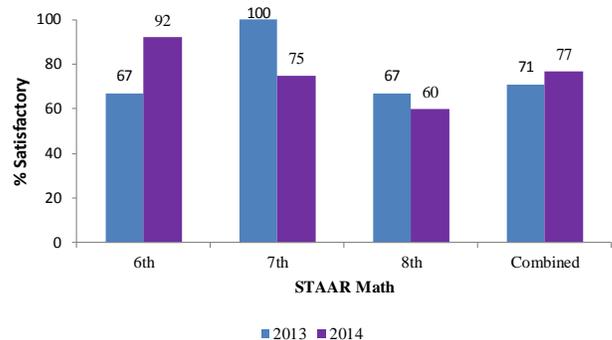


Figure 2. STAAR mathematics results of S.E.L.F. students before and after S.E.L.F. program participation (2013 vs. 2014).

Table 2: Paired T-test Analysis Based on STAAR Results of KMS S.E.L.F. Students with Two Years of Test Data, 2013 vs. 2014

	Pre STAAR Scale Scores 2013			Post STAAR Scale Scores, 2014			MD	t	p
	n	M	Std	M	Std				
<b>Reading</b>									
6th	9	1488	147	1531	94	43	1.25	0.1228	
7th	7	1593	142	1621	128	28	1.16	0.1447	
8th	6	1615	93	1610	71	-5	-1.740	.4343	
<b>Math</b>									
6th	9	1495	131	1618	96	123	2.96	.0091*	
7th	6	1672	106	1595	100	-77	-2.36	.0325*	
8th	6	1545	45	1632	62	87	3.54	.0083*	

Table 3: STAAR Reading and Mathematics Passing Rates for Key S.E.L.F. Students with 2014 Data Compared to All Key Students by Grade Level, First Test Administration, 2014

	Grade 6		Grade 7		Grade 8	
	S.E.L.F. (n = 13) %	All Key (n = 204) %	S.E.L.F. (n = 7) %	All Key (n = 174) %	S.E.L.F. (n = 10) %	All Key (n = 185) %
<b>Reading</b>	40	52	86	54	60	68
<b>Mathematics</b>	92	70	75	47	60	71

However, the combined performance of these students reflected an increase of six percentage points in mathematics.

**Table 2** presents paired t-test analysis based on STAAR reading and mathematics scale scores of students with test results in 2013 and 2014. There were increases in scores for sixth and seventh-grade students in reading, and statistically significant increases in scales scores for six and eighth-grade students in mathematics ( $p < .05$ ). The largest gains were noted in sixth and eighth grade mathematics (123 and 87 points, respectively). At the same time, a drop in scale scores were observed in eighth-grade reading (-5) and in seventh grade mathematics (-77 points). Results were statistically significant in seventh grade mathematics ( $p < .05$ ).

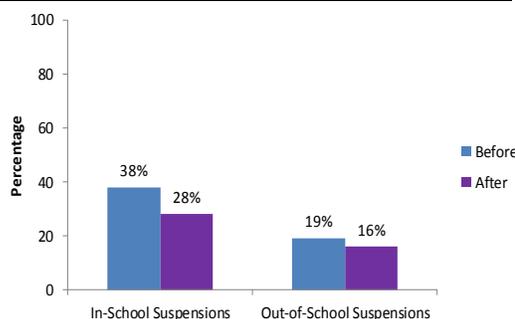


Figure 3. Percentage of students with disciplinary actions, 2013–2014

Source: Chancery Student Information System (as of 6/23/2014)

Table 3 compares the 2014 STAAR reading and mathematics passing rates of all Key S.E.L.F. Foundation students with 2014 data to the 2014 passing rates of all students at Key. The reading performance of program students exceeded the performance of all Key students at sixth and eighth grades in mathematics as well as in seventh grade in both reading and mathematics.

#### **What was the rate of disciplinary actions and absenteeism among program participants before and during the program?**

**Figure 3** displays disciplinary action rates of program participants prior to the start of the program (August 30, 2013 through February 15, 2014) and during the program (February 17, 2014 through May 15, 2014). The percentage of in-school suspensions dropped from 38% to 28%. The percentage of out-of-school suspensions also dropped over the same time period from 19% to 16%. Twelve students were represented in the in-school suspension data and six were included in the out-of-school data prior to the start of the program. In contrast, nine students were represented in the in-school suspension and five students were represented in the out-of-school suspension results during the program.

Attendance was measured using the number of days that students were absent from school without an excuse based on HISD policy. There were 56 days during the program and 108 days before the program that students were required to be in attendance. Percentages were calculated for each student based on the total number of unexcused absences (during the program (56 unexcused absences) and before the

Table 4. Differences Between Number and Percentage of Students with Unexcused Absenteeism Before and During the Program, 2013–2014

	Change in Rate of Unexcused Absences Before vs. During Program		N	%
	Range			
Decrease	1% - 3%		9	28
Decrease	> 3%		0	0
Unchanged	0 %		7	22
Increase	1% - 3%		10	31
Increase	> 3%		6	19
<b>Total</b>			<b>32</b>	<b>100</b>

Source: Data Warehouse program (108 unexcused absences). The differences between the percentages were, then calculated to determine whether there was a decrease, no change, or an increase in the percentage of unexcused absences for each student.

Table 4 shows that 28% of the program students had between a 1% and 3% drop in the percentage of unexcused absences. Comparatively 50% of the students had a higher rate of unexcused absences during the program compared to before the program.

**What were students’ perceptions regarding program components?**

Key S.E.L.F. Foundation students were asked to indicate whether or not afterschool program components benefitted them in school or in their personal life “now”. Thirty students completed the survey, yielding a 94% response rate. The results are presented in Figure 4.

All of the students indicated that they were currently benefitting from “Physical Activities” offered in the program (100%). The program

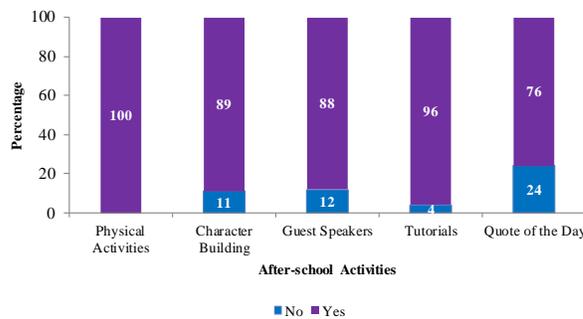


Figure 4. Percentage of students who indicated whether or not they were benefitting “now” from S.E.L.F. program activities, 2014

component that students perceived the next highest benefit was “Tutorials” (96%). Students were least likely to reveal that they benefitted from the “Quote of the Day” (76%).

Nineteen program students wrote general comments about the program components, all of which were positive. Comments from four of the students were:

*“I think [the program] helps us with goal setting, what we [want to be] in life.”*

*“It helps me connect with people.....”*

*“This activity benefits us kids to cooperate with each other.”*

*“I feel the S.E.L.F. program has helped me because I look up to adults[;] so having successful adults come and speak and try to guide me in the right direction has really helped me.”*

Finally, another student wrote:

*“I thank Bo Porter for coming to our school and doing his programs. If it wasn't for him we would've never had a program [to] come to our school and do lots of activities with us.”*

An assessment of students’ interests and needs were explored through the survey. The results are reflected in Figure 5. Students were asked whether or not they would benefit from a list of specific topics in

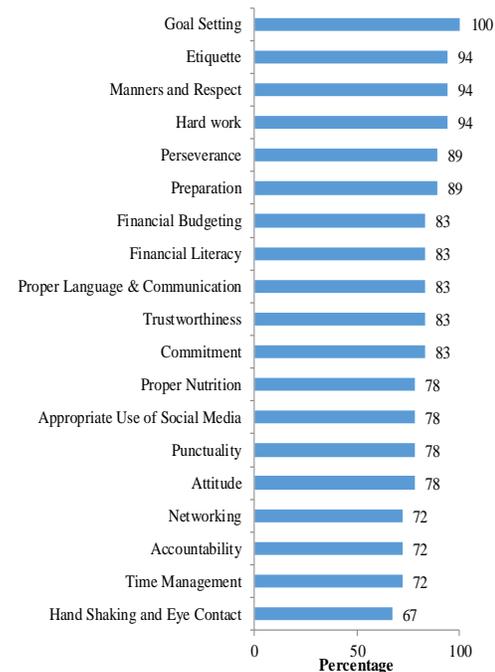


Figure 5. Student perceptions regarding program topics that may benefit them in the “future”, 2014

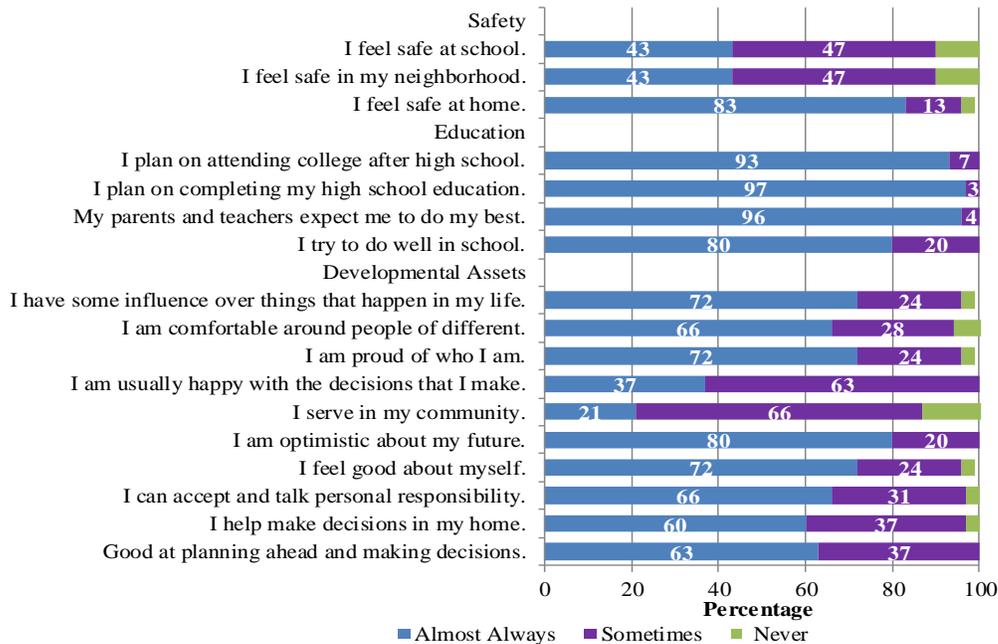


Figure 6. Student perceptions regarding their feelings on issues related to safety, education, and developmental assets since participating in the program, 2014

the “future” at school or in their personal life. These data will be used for planning. The topics were considered to promote growth and development in youth. Thirty students responded to the question. While some students indicated that they would benefit from all of the topics, the highest percentage of students responded to “Goal Setting” (100%) (Figure 5). Students were equally responsive to topics on “Etiquette,” “Manners and Respect,” and “Hard Work” (94%).

**What were students’ perceptions relative to safety, education, and developmental assets?**

Figure 6 presents results on survey items designed to assess students’ feelings related to safety, education, and developmental assets. Frequency distributions depicting the percentage of students who rated each item as “almost always,” “sometimes,” and “never” are presented in Figure 6. Students were asked to indicate what best reflected their feelings since participating in the program. The results are limited as data related to their feelings in the designated areas were not gathered prior to program

participation. Related to safety, the highest percentage of students expressed that they “almost always” felt safe at home (83%). Students were highly positive concerning their education, with 97% revealing that they “almost always” feel that they plan to complete high school and attend college (93%). Only 80% of students indicated that they “almost always” feel that they try to do well in school. Students were weakest in expression of the developmental assets of serving in their community (21% “almost always”) and happy with the decisions they make (37% “almost always”). They were strongest in feeling “optimistic about their future” (80% “almost always”).

**Discussion**

The Stacy and Bo Porter S.E.L.F. Foundation has collaborated with the HISD beginning in the spring 2014 to implement a pilot afterschool program at Key Middle School. Student participants were provided mentoring and coaching opportunities along with lectures on topics that supported developmental assets and character building. Engagement in physical activities was an integral component of the

program. The research has shown that there may be social, emotional, and behavioral benefits in youth participating in quality afterschool programs (U.S. Department of Education, 2003).

This report provided analysis of students' performance on the STAAR reading and mathematics tests, discipline, and attendance. Discipline outcomes were measured based on rates of in-school and out-of-school suspensions before compared to during the program. Attendance was assessed by measuring differences in the rate of unexcused absences prior to the program compared to during the program. On STAAR, statistically significant increases were noted in mathematics for sixth- and eighth-grade participants, while significant decreases were found for seventh-grade students. In most cases, program students' test performance exceeded the performance of all Key Middle School students, specifically at sixth-grade in mathematics, seventh-grade in reading and mathematics, and at eighth-grade in mathematics.

There were several issues that were of concern. Specifically, students expressed that they were less likely to feel "safe" at school and in their neighborhoods than at home. At the same time, students' attendance reflected increased proportions of unexcused absences during the program compared to before the program. These issues of safety and attendance may, potentially, highlight a need for exploration of why students are being challenged in these areas and to consider the need for related interventions through the S.E.L.F. Foundation program.

Students' disciplinary actions decreased; however, a large number of students continued to experience in- and out-of-school suspensions. Excessive school absence may be an early warning indicator for poor academic achievement. Thus, targeted behavior support strategies might be offered through the program to address discipline.

Although the vast majority of students indicated that they frequently try to do well in school, efforts should be continued to support them by building academic confidence, possibly through additional academic supports.

There are limitations to this evaluation, including a lack of a statistically-matched comparison group to demonstrate impact. However, the use of a whole school-comparison group may be acceptable for making programmatic decisions, considering that program students were demographically-similar to their school-based peers. Another limitation was that changes in students' perceptions prior to the program were not measured regarding safety, education, and developmental assets using a pre- posttest format. Thus, whether or not their feelings differed over the course of the program was not clearly evident.

In spite of the methodological challenges, there were promising results for students who participated in the Stacy and Bo S.E.L.F. Foundation program, considering that it was a pilot program that was implemented over a brief, three-month period. Students' comments regarding how the program benefitted them in targeted social and academic areas, such as character building, physical fitness, and tutorials, may have long-term benefits as they continue their education and consider careers. It is recommended that these types of activities remain as integral components of the program. Other behavior-related activities, including goal setting, etiquette, manners, respect, and hard work, should be considered as additions to the program because students indicated that they would benefit from them in the future. Issues, such as discipline, attendance, along with school and neighborhood safety can be incorporated in the program, engaging parents, community members, and school staff.

Future evaluations should continue to monitor the academic achievement and development of S.E.L.F. Foundation students at Key Middle School throughout its expansion to assess their perceptions and performance longitudinally. Comparative analysis should be conducted with similar student groups who did not participate in the program as well as future adopters of the program in the 2014–2015 academic year.

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For additional information contact the HISD Department of Research and Accountability at 713-556-6700 or e-mail [Research@Houstonisd.org](mailto:Research@Houstonisd.org).



# EVALUATION REPORT

BUREAU OF PROGRAM EVALUATION

Volume 8, Issue 1, August 2014

## *Houston Real Men Read: What was the experience of mentors during the sixth year of the program, 2014?*

By Deborah L. Muñiz

*Houston Real Men Read is chaired by Texas Senator Rodney Ellis and spearheaded by the Houston Independent School District (HISD) Board Trustee Paula M. Harris. Houston Real Men Read is a mentoring program in which men from the Houston community committed one hour, once a month, to read to second, fifth, and seventh-grade students. The program reinforced three fundamental principles: reading is fun, the community cares, and a commitment to education can ensure success. An estimated 200 mentors were assigned to 48 participating schools. This brief was designed to summarize the results from the Houston Real Men Read mentor survey. Responses indicated that overall mentors enjoyed participating in the program. Also, the reading performance of participating schools was higher than the district at second and seventh grades.*

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### Data and Methods

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This was the sixth year of the Houston Real Men Read program. The reading dates were November 21 and December 19, 2013, as well as January 16, February 20, and May 15, 2014. During the 2013–2014 school year, an estimated 200 mentors participated in the program at 48 elementary and middle schools. Of these schools, three have participated in the program all six years. There have been a total of 100 campuses that have participated in Houston Real Men Read over the six past years.

Campus representatives were asked to submit the names of their mentors along with their email addresses to HISD's Library Services. About 52 emails for mentors were collected. Mentors were asked to complete an electronic survey stored on-line using the survey tool, Survey Monkey. A total of 24 mentors completed the survey during May of 2014. This accounted for a 46 percent response rate of those who received the survey. The majority of the mentor respondents (67 percent) were assigned second grade, followed by 42 percent who were assigned fifth grade, and none were assigned to seventh grade (percentages do not total 100 due to mentors who were assigned multiple grade levels). Percentages were based on the total

number of responses. The survey also included open-ended questions.

Results for the Stanford 10 reading subtest were examined at the second, fifth, and seventh grades for participating schools. Specifically, Normal Curve Equivalents (NCEs) were aggregated across the participating schools. State of Texas Assessments of Academic Readiness (STAAR) results on the reading portion were aggregated at the fifth and seventh grades for participating schools. Achievement results for participating schools were compared to the district.

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### How did mentors hear about the Houston Real Men Read program?

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Houston Real Men Read mentors were asked to indicate how they heard about the program. **Figure 1** displays the percent of mentors that heard about the program via a friend, employer or media. The largest percent of mentors (42 percent) heard about the program through a friend, while 29 percent of mentors heard about the program through their employer. Also, four percent of mentors heard about the program through the media. The category "other" included responses, such as church, school librarian and fraternity (25 percent).

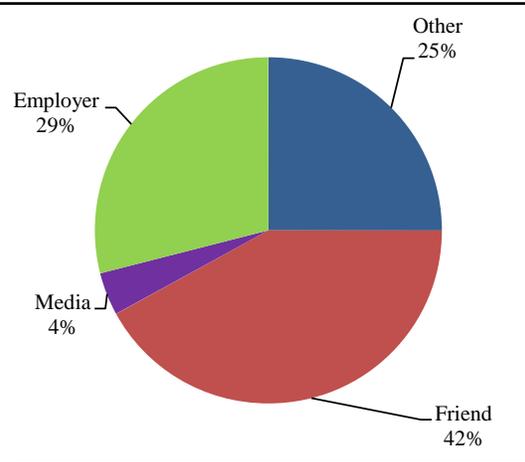


Figure 1. How mentors first heard about the Houston Real Men Read program.

### How did mentors rate the various components of the Houston Real Men Read program?

Mentors were asked a series of questions about the various components of the Houston Real Men Read program. **Tables 1a** and **1b** present a comparison of mentor response rates from 2009–2014. In 2014, the majority of mentors rated the following components as “excellent:” welcome by school (88 percent), classroom experience (78 percent), communication from campus representative (67 percent), book selection (52 percent), and

Table 1a. Mentor Survey Response Rates on Components of the Houston Real Men Read Program, 2009–2014

Components	Very Good						Excellent					
	'09	'10	'11	'12	'13	'14	'09	'10	'11	'12	'13	'14
Application Process	<b>32</b>	<b>49</b>	39	<b>52</b>	<b>42</b>	<b>57</b>	31	27	<b>42</b>	32	40	39
Orientation	<b>36</b>	<b>40</b>	36	<b>40</b>	<b>44</b>	<b>57</b>	30	27	<b>41</b>	<b>40</b>	36	39
Book Selection	32	31	39	33	29	30	<b>45</b>	<b>35</b>	<b>41</b>	<b>46</b>	<b>44</b>	<b>52</b>
Timeliness of Book Distribution	29	37	27	31	35	38	<b>36</b>	<b>40</b>	<b>55</b>	<b>50</b>	47	<b>42</b>
Lesson Guides	33	<b>36</b>	33	<b>46</b>	30	<b>46</b>	<b>46</b>	33	<b>50</b>	38	<b>52</b>	<b>46</b>
Communication from Campus Representative	28	16	20	24	24	33	<b>55</b>	<b>70</b>	<b>73</b>	<b>66</b>	<b>69</b>	<b>67</b>
Communication from Central Administration	32	<b>38</b>	24	26	<b>34</b>	41	<b>38</b>	34	<b>44</b>	26	31	<b>50</b>
Welcome by School	19	21	18	26	16	13	<b>77</b>	<b>74</b>	<b>79</b>	<b>73</b>	<b>79</b>	<b>88</b>
Classroom Experience	18	18	20	20	24	22	<b>78</b>	<b>74</b>	<b>79</b>	<b>80</b>	<b>73</b>	<b>78</b>

Note: “Bold” indicates the highest rating for that component by year.

Table 1b. Mentor Survey Response Rates on Components of the Houston Real Men Read Program, 2009–2014

Components	Needs Improvement						Okay					
	'09	'10	'11	'12	'13	'14	'09	'10	'11	'12	'13	'14
Application Process	7	7	0	0	2	0	30	17	20	16	16	4
Orientation	8	7	6	0	5	0	26	26	17	21	15	4
Book Selection	7	8	5	6	12	0	16	26	15	16	16	17
Timeliness of Book Distribution	14	3	3	4	5	8	21	21	15	14	14	13
Lesson Guides	3	7	2	3	2	0	17	25	15	13	16	8
Communication from Campus Representative	7	3	0	3	0	0	10	12	8	7	7	0
Communication from Central Administration	4	5	5	12	9	0	26	23	27	<b>35</b>	26	9
Welcome by School	0	0	0	0	0	0	4	5	3	1	5	0
Classroom Experience	1	3	0	0	1	0	3	5	2	0	2	0

Note: “Bold” indicates the highest rating for that component by year.

communication from central administration (50 percent). Compared to previous years, this was the first time that the book selection was rated as “excellent” by the majority of mentors. HISD’s Department of Library Services made changes to the book selection based on the previous year’s mentor and student survey results. **Table 2** provides a list of the book selections for the 2013–2014 school year.

The program component with the highest percent of mentors rating it as “needs improvement” or “okay” was timeliness of book distribution (21 percent). One of the comments was, “I would like to receive the books prior to the time I will meet with the children. I would like to have enough time to read the books.”

Overall, throughout the six years of the program, the overwhelming majority of mentors have rated all of the program components as “very good” or “excellent.”

### How did the mentors describe their experience with the Houston Real Men Read program?

Mentors had an opportunity to describe their experience in the Houston Real Men Read program. There were a total of 24 comments that were all categorized as a “positive experience.” Some of the responses included:

- Wonderful, it is a great opportunity to participate with other like-minded men for the advancement of helping children and

Table 2. HISD Real Men Read Book Selections for the 2013–2014 School Year by Grade

<u>Month</u>	<u>Second Grade</u>	<u>Fifth Grade</u>	<u>Seventh Grade</u>
November	<i>A Cool Drink of Water</i>	<i>My Havana</i>	<i>Heat</i>
December	<i>Tia Isa Wants a Car</i>	<i>The Dreamer</i>	<i>Handbook for Boys</i>
January	<i>Grandma's Gift</i>	<i>Nic Bishop's Spiders</i>	<i>Face to Face with Sharks</i>
February	<i>Not Norman</i>	<i>Bud, Not Buddy</i>	<i>The Jumping Tree</i>
May	<i>My Name is Yoon</i>	<i>Broken Bike Boy and the Queen of 23<sup>rd</sup> St.</i>	<i>Esperanza Rising</i>

taking an active part in their lives.

- My experience has been nothing less than a positive life changing event. I have a better appreciation for teachers and their challenges. I feel like I have the ability to inspire a child or help bring brightness to their day.
- To sum up my experience: The Real Men Read program has a certain 'feel good' factor for all, but what I personally find the most gratifying is seeing the first-hand evolutionary development of the children's reading skills and the boost of confidence while reading.

Mentors were also asked "Do you plan on volunteering as a mentor for the Real Men Read program next school year?" Approximately, 79 percent indicated "yes," eight percent "maybe," and 13 percent "no." **Figure 2** shows the number of years that surveyed mentors have volunteered in the Houston Real Men Read program. Most of the mentors indicated that this was their first time to volunteer in the program (33 percent). About 29 percent had volunteered

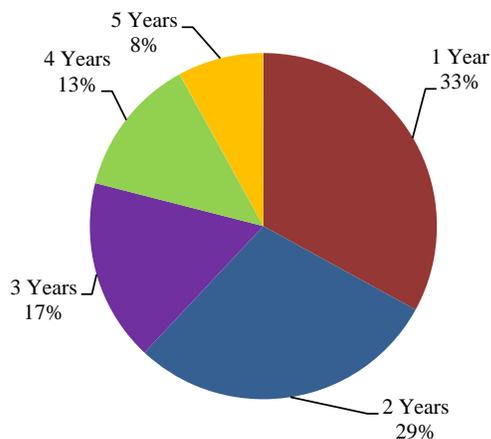


Figure 2. Number of years mentors have volunteered in the Houston Real Men Read program.

for two years; 17 percent for three years, 13 percent had volunteered four years, and eight percent for five years. None of the respondents had volunteered all six years of the program. All of the mentors stated that they would recommend others to participate in the Houston Real Men Read program. Lastly, mentors were asked, "Has your participation in the Real Men Read program encouraged you to increase your involvement in other volunteer opportunities at your current campus or another campus?" Thirty-eight percent stated "yes," 46 percent "maybe," and 17 percent "no."

#### **What were the reading results of participating schools?**

**Table 3** shows the aggregated 2014 STAAR reading results for Houston Real Men Read campuses compared to the district for fifth and seventh grades. Specifically, the percent met satisfactory under phase-in 1 standards and the percent who met advanced standards were presented. There was no difference in the percent of students who met satisfactory performance between Houston Real Men Read campuses and the district in fifth grade. There was a one percentage point difference between Houston Real Men Read campuses and the district for the percent met advanced standard in favor of HISD at fifth grade. Approximately, 74 percent of seventh-grade students at Houston Real Men Read campuses met the satisfactory standard compared to 67 percent for the district. Also, a higher percent of seventh-grade students at Houston Real Men Read campuses (20 percent) met the advanced standard compared to the district (16 percent).

Table 3. STAAR Reading Results for Houston Real Men Read (HRMR) Campuses compared to the District, 2014

<u>Grades</u>	<u>% Satisfactory</u>		<u>% Advanced</u>	
	<u>HRMR</u>	<u>HISD</u>	<u>HRMR</u>	<u>HISD</u>
5	68	68	15	16
7	74	67	20	16

Source: Data Warehouse

**Table 4** shows the Stanford 10 reading results for Houston Real Men Read campuses and the district for second, fifth, and seventh grades. Specifically, the National Percentile Rank (NPR) and Normal Curve Equivalent (NCE) scores were presented. At second grade, Houston Real Men Read campuses had a mean NCE of 43 compared to 42 for the district. At fifth grade, there was no difference in performance for Houston Real Men Read campuses compared to the district. Performance on the reading subtest at seventh grade showed that Houston Real Men Read campuses had a higher mean NCE than HISD. **Figure 3** shows the percent at or above the 50<sup>th</sup> percentile. Approximately, 41 percent of seventh-grade students at a Houston Real Men Read campus scored at or above the 50<sup>th</sup> NPR compared to 35 percent for the district.

## Conclusions

Survey results indicated that mentors enjoyed participating in the Houston Real Men Read program. This was evident in that the majority of mentors plan on participating in the program

Table 4. Stanford 10 Reading Results for Houston Real Men Read (HRMR) Campuses compared to the District, 2014

<u>Grades</u>	<u>NCE</u>		<u>NPR</u>	
	<u>HRMR</u>	<u>HISD</u>	<u>HRMR</u>	<u>HISD</u>
2	43	42	37	36
5	43	43	37	37
7	46	42	42	34

Source: Data Warehouse

Percent At or Above 50<sup>th</sup> NPR Stanford 10 Reading

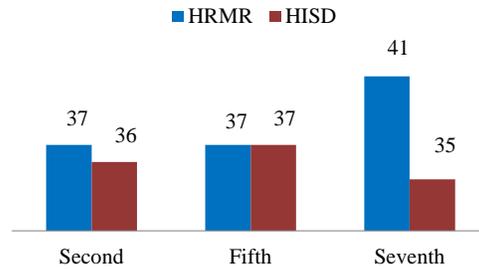


Figure 3. Percent At or Above 50<sup>th</sup> NPR Stanford 10 Reading.

during the next school year. Also, the majority of the program components were highly rated by mentors. The HISD Library Services Department made updates to the book selection to reflect the reading interests of students surveyed during the 2012–2013 school year. These updates may have been an influence in the majority of the mentors rating the book selection as “excellent.” Mentors did indicate that they would like to receive the books prior to the reading dates. Program personnel may want to consider ordering book sets for mentors to distribute during the orientation so schools could pass out the book sets during the first reading.

Achievement data suggest some impact of mentoring at seventh grade; however, it is difficult to draw conclusions based on overall performance at the campus. The Houston Real Men Read program is a mentoring program that functions to create a culture of reading, community involvement, and positive male role models with regards to reading. Survey results from the previous school year showed that students enjoyed having men from the community give their time to read to them.

For additional information contact the HISD Department of Research and Accountability at 713-556-6700 or e-mail [Research@Houstonisd.org](mailto:Research@Houstonisd.org).



# EVALUATION REPORT

BUREAU OF PROGRAM EVALUATION

Volume 8, Issue 1, August 2014

## *What was the impact of the Achieve 3000 literacy program on student reading performance, 2013–2014?*

By **B. Robert Reeves**

*Achieve 3000 was implemented during the 2013–2014 school year. This program was designed to increase student Lexile levels. Specifically, Achieve 3000 was targeted at students in the tenth grade in selected schools. There were 5,023 tenth-grade students from 17 participating high schools who utilized the web-based program. Of these 5,023 students, data were obtained for 4,340 students. This brief was designed to analyze the results from the STAAR EOC English II and the Lexile growth as calculated by pre-and post-test that Achieve 3000 provided. Results indicate that the program improved student Lexile scores, increased EOC English II scale scores, and improved the likelihood of the student passing the EOC English II exam at the Phase-in 1 standard both with and without controlling for student characteristics and school effects.*

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### Background

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Achieve 3000 is a web-based differentiated K-12 reading program. The program aims to raise reading and writing abilities among students by determining the Lexile level of the student and targeting reading activities to the student's current capabilities.

This was the first year of the implementation of Achieve 3000. During the 2013–2014 school year, an estimated 5,023 tenth-grade students participated in the program at 17 high schools.

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### Data and Methods

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Pre-and post-test results and the number of lessons completed by students participating in Achieve 3000 were obtained from the department of Curriculum, Instruction, and Assessment. These results provided Lexile levels based only on informational text for the participating students, which gave the teachers a snapshot of students' reading ability and can be used as a guideline by teachers for appropriate reading assignments for each student. Results from the STAAR End-of-Course (EOC) assessment in English II were also analyzed.

There were two main points of analysis. The first examined the effect of Achieve 3000 on the STAAR EOC English II results. There were two regression models tested for each of the three dependent variables (EOC English II Scale Score, passing EOC English II at the Phase-in 1 standard, and passing EOC English II at the Phase-in 2 standard). The first regression model did not control for student characteristics or campus effects, while the second regression model controlled for both of these factors. The student characteristics included gender, limited English proficiency (LEP) status, at-risk status, economic status, ethnicity, and whether or not students were enrolled in special education. The causal variable of interest in all of the regression models was the number of activities completed in Achieve 3000.

The second main point of analysis was how effective Achieve 3000 was at increasing student reading performance as measured by Lexile levels. Achieve 3000 calculates student Lexile scores based on pre- and post-program tests based only on informational text and how the student performs during activities. This measure was used to determine the impact of the program on student reading performance. Two regression models were tested using Lexile scores as the

dependent variable for the 2,782 students. The first analyses did not control for school attended or student characteristics, as listed above, while the second did. Again, the causal variable of interest was the number of activities completed in Achieve 3000.

The majority of students at schools that utilized the program were historically low performing. As illustrated by **Figure 1**, students who attended schools that did not receive Achieve 3000 had a 62.7% passing rate at the Phase-in 1 standard on the 2013 EOC English I Reading, while the schools that did receive the program had a 51.3% passing rate. This introduces a selection bias and limits the analysis of direct HISD comparisons that a random assignment would have provided.

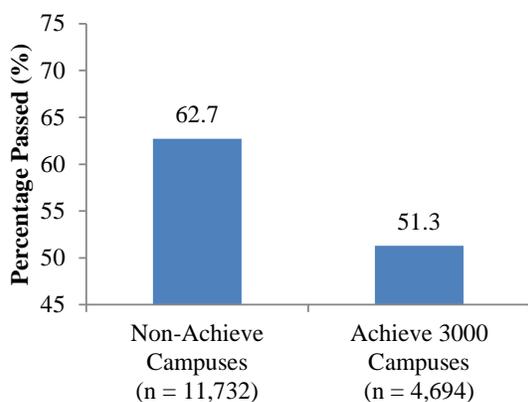
Another limitation relates to schools not systematically implementing the program across the district. Therefore, all results discussing the overall effectiveness of Achieve 3000 are based on the program being implemented at the campus and not on a specific method of implementation.

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#### **What was the implementation process for Achieve 3000?**

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This was Achieve 3000's first year of implementation in HISD. Participation was voluntary and schools requested and received professional development and licenses for the Achieve 3000 program. Seventeen campuses received licenses: Furr, Jones, Kashmere, Lee, Eastwood Academy, Madison, Sterling, Waltrip, Washington, Wheatley, Worthing, Sharpstown, Scarborough, Westside, Sam Houston Math, Science, and Technology, Houston Academy of International Studies, and North Forest High. At




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Figure 1. 2013 English I Reading Passing Rate

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the school level, each campus selected students for program participation based on their own criteria.

The professional development for program implementation varied by campus. The first set of schools (Eastwood, Jones, Kashmere, Waltrip, Houston Academy for International Studies, and Worthing high schools) received one day of professional development services and a maximum platform access for 100 students. The next set of schools (Furr, Scarborough, Sterling, and Wheatley high schools) received two days of professional development services and a maximum platform access for 250 students. The third group (Lee and Sharpstown high schools) received two days of professional development services and platform access for a maximum of 375 students. The next group (Sam Houston and Madison high schools) received platform access for up to 500 students and three days of professional development services. Finally, Westside High School received three days of professional development training and platform access for up to 675 students. Although the original contract had a set number of licenses, Achieve 3000 allowed additional students to receive access at no additional cost to HISD.

HISD spent a total of \$242,315 for use of the program and training from July 1, 2013 to June 30, 2014. Students who received licenses could complete as many activities as desired and had access to the program both inside and outside of school for the academic year. If each license received was used and each student was to reach the goal of 40 total activities, the district will have paid approximately \$1.22 per activity. If each student completed 80 activities, the district would have paid approximately \$0.61 per activity.

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#### **What were the demographic characteristics of HISD students who participated in Achieve 3000?**

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There were 12,697 tenth-grade students in HISD during the 2013–14 schools year. Of these students, 5,023 participated in the Achieve 3000 program. Data were available for 4,340 of the participants. There were 2,184 students who completed at least one activity in the Achieve 3000 program, 700 who completed more than five activities, 230 completed at least 10 activities, 59 completed at least 20 activities, and only eight completed at least the recommended 40 activities.

Table 1. Demographic Data for Achieve 3000 Students Compared to HISD 10<sup>th</sup> Grade Students, 2013–2014

Variables	HISD 10th Graders		Achieve 3000 10th Graders		Completed at least One activity	
	N	%	N	%	N	%
Total Enrollment	12,697	-	4,340	-	2,184	-
<b>Gender</b>						
Male	6,396	50.4	2,304	53.1	1,179	54
Female	6,301	49.6	2,036	46.9	1,005	46
<b>Ethnicity</b>						
African American	3,356	26.4	1,387	32	673	30.8
Asian/Pacific Islander	469	3.7	77	1.8	32	1.5
American Indian	45	0.4	16	0.4	10	0.5
Hispanic	7,338	57.8	2,605	60	1,391	63.7
White	1,377	10.8	228	5.3	68	3.1
Two or More	112	0.9	27	0.6	10	0.5
Econ Dis	9,167	72.2	3,470	80	1,824	83.5
At-Risk	7,814	61.5	3,026	69.7	1,533	70.2
Special Education	1,185	9.3	443	10.2	173	7.9
LEP	1,253	9.9	523	12.1	258	11.8
Gifted/Talented	1,966	15.5	498	11.5	223	10.2

Source: PEIMS 2013 Fall Snapshot

Comparing the population of participating students to all HISD students, the demographic characteristics were similar but not identical (see **Table 1**). More males (53.1%) were represented in the program compared to males in the HISD student population (50.4%). There was also a higher percentage of African American (32% vs. 26.4%) and Hispanic students (60% vs. 57.8%), and a lower percentage of Asian/Pacific Islander (1.8% vs. 3.7%) and White students (5.3% vs. 10.8%) who participated in the program than in HISD. Economically disadvantaged, at-risk, special education, and LEP students had a higher representation in the Achieve 3000 program than in HISD, while the gifted and talented students had a lower representation.

There were also no large demographic differences between those enrolled in the Achieve 3000 program and those who completed at least one activity. White, African American, special education, LEP, and gifted and talented students had a lower rate of activity completion, while Hispanic and economically-disadvantaged students had a noticeably higher participation rate. The specific demographic breakdown is presented in Table 1.

#### **Has usage of Achieve 3000 increased student performance on the STAAR EOC English II?**

To assess the ability of Achieve 3000 to increase student performance on the STAAR EOC English II, the effect on increasing scale scores and the probability of the student passing

at the Phase-in 1 and Phase-in 2 standards was examined. The results of these analyses are presented in **Appendix A, Table 1** (see page 7).

#### **Scale Score**

The average EOC English II scale score for all HISD students during the 2013–14 school year was 3826. Non-Achieve 3000 average scale scores were 3947 and students who completed at least one activity of the Achieve 3000 program averaged a scale score of 3841. To pass the EOC English II exam at the Phase-in 1 standard, a student needed to have at least a 3750 scale score. They needed at least a scale score of 3900

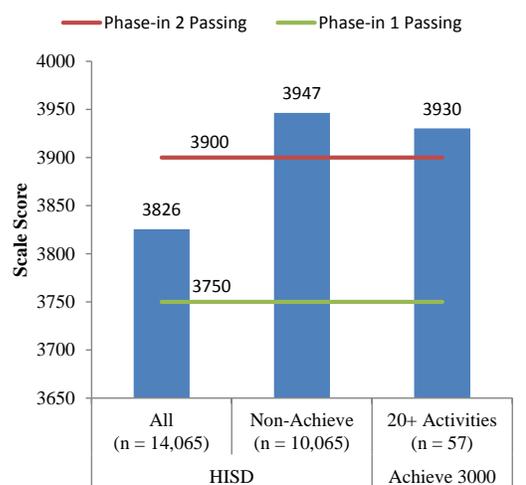


Figure 2. Average 2014 EOC English II Scale Scores for Achieve 3000 Students vs. Non-Achieve 3000 Students

to pass at the Phase-in 2 standard. As illustrated in **Figure 2**, the average scale score for students who completed at least 20 activities (3930) and the average scale score for non-Achieve 3000 students (3947) was higher than the Phase-in 2 standard, while the average scale score for all HISD students (3826) was below the Phase-in 2 standard but above the Phase-in 1 standard. **Appendix B, Figure 1** provides a more detailed graph of this information showing average scale scores for Achieve 3000 students based on the number of activities completed (see page 8).

Graphically, there was a positive correlation between scale scores and the number of activities completed. Statistically, the number of activities had a positive and statistically significant effect on the EOC English II scale score regardless of school or student characteristics.

When there were no characteristics controlled for, the number of activities completed was significant at the  $p < 0.01$  level and shows approximately a seven point increase in the scale score for each activity completed. However, the  $R^2$  was only .0044. Therefore, the model explained less than 1% of the variance in scale scores.

When student characteristics and school attended were controlled for, the number of activities completed was still significant, though only at the  $p < 0.05$  level. The magnitude of the effect was reduced to approximately a three point increase for each activity completed. However, the  $R^2$  increased to .51. Therefore, the model explains over 50% of the variance in EOC scale scores.

### ***Passing EOC English II at the Phase-in 1 Standard***

To determine the effectiveness of completed activities on whether or not students passed the EOC English II exam at the Phase-in 1 standard, two probit models were used. The first did not control for student characteristics and school attended, while the second one did. The results and marginal effects were both positive and statistically significant for the number of activities completed in both models. These results are illustrated in **Appendix B, Figure 2** (see page 8). **Figure 3** provides a snapshot of Appendix B, Figure 2. It illustrates the 2014 EOC English II passing rate at the Phase-in 1 standard for all HISD tenth-grade students, tenth-grade students who attended campuses

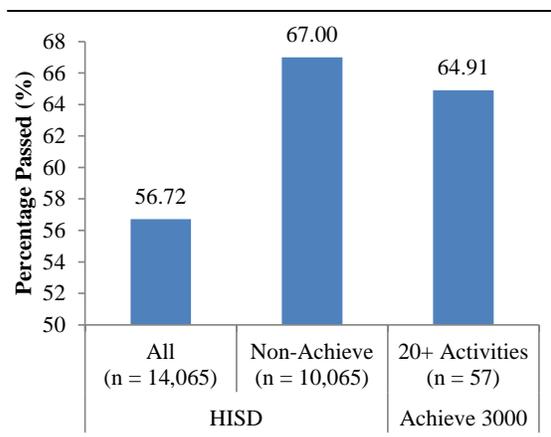


Figure 3. EOC English II Phase-in 1 Passing

without the Achieve 3000 program, and students who completed at least 20 activities of the Achieve 3000 program.

As predicted by the previous 2012–13 EOC Reading 1 results presented earlier, the campuses without the Achieve 3000 program outperformed the campuses with the program. This further illustrates that analysis should only include campuses that obtained access to Achieve 3000 due to selection bias.

Without controlling for students or the school attended, activities completed was significant at the  $p < 0.01$  level and had a marginal effect of .008 which was also significant at the  $p < 0.01$  level. The pseudo- $R^2$  was also very low at .0038, meaning the model explained less than 1% of the variance in passing the EOC English II exam at the Phase-in 1 standard.

Once the student characteristics and school attended are controlled, the coefficient and marginal effects for activities completed both decrease, but are still significant at the  $p < 0.05$  level. The pseudo- $R^2$  for this model is .26, with the model explaining 26% of the variance.

**Appendix B, Figure 3** (see page 9) illustrates the predicted probability of passing the EOC English II exam at the Phase-in 1 standard. The predicted probability was created by using the probit model which controlled for school attended and demographic variables, assigned each variable its mean value, and allowed the activities variable to vary. The predicted probability shows what the expected passing rate of the EOC English II exam at the Phase-in 1 standard would have been if each tenth-grade student at the schools that received licenses had completed the designated number of activities.

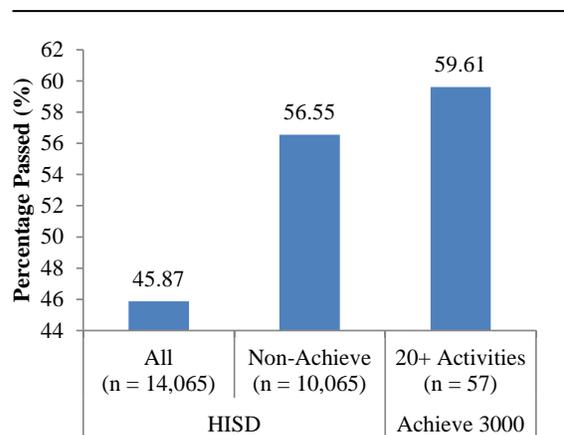


Figure 4. EOC English II Phase-in 2 Passing

### Passing EOC English II at the Phase-in 2 Standard

The same methodology was used to examine passing rates at the Phase-in 1 standard was used to examine the effectiveness of completed activities on whether or not students passed the EOC English II exam at the Phase-in 2 standard. When school attended and student characteristics were omitted, the number of activities completed no longer had a statistically significant effect. The results are presented in Appendix A, Table 1 (see page 7) and illustrated in **Appendix B, Figure 4** (see page 9). **Figure 4** provides a snapshot of Appendix B, Figure 4. It illustrates the 2014 EOC English II passing rate at the Phase-in 2 standard for all HISD tenth-grade students, tenth-grade students who attended campuses without the Achieve 3000 program, and students who completed at least 20 activities of the Achieve 3000 program.

Without controlling for student characteristics or the school attended, the activities completed was significant at the  $p < 0.05$  level and had a marginal effect of .004, which was also significant at the  $p < 0.05$  level. The pseudo- $R^2$  was also very low at .0011, meaning the model explained less than 1% of the variance in passing the EOC English II exam at the Phase-in 2 standard.

Once the student characteristics and school attended were controlled, the coefficient and marginal effects for activities both become statistically insignificant ( $p = .62$ ). Therefore, Achieve 3000 had no statistically significant effect on students passing the EOC English II exam at the Phase-in 2 standard.

### HISD Comparison

Since each campus obtained a limited number of Achieve 3000 licenses, a comparison could be made with those students who did not have access. A two-sample t-test showed a statistically significant difference between the students who had access to the program ( $p = 0.00$ ), where students with access to the program performed better.

Due to the lack of fidelity in determining which students obtain access to the program at the individual campuses, the t-test cannot be stated as an indicator of program success.

### Cost-Benefit Analysis

Achieve 3000 has shown to have a positive effect on EOC English II outcomes, but the cost of the program must be considered when analyzing the benefit to the district. As shown earlier, there was \$242,315 spent on the program for the 2013-14 school year. If 40 activities were completed for each license, then a total of 198,000 would have been completed and the district would have paid \$1.22 per activity

In practice, only 11,107 activities were completed by the students that had data available. It cost a total of \$21.82 per lesson completed, for a gain of approximately three points in the scale score, and an increase of about half a percentage point to the mean conditional probability of a single student passing the EOC English II exam at the Phase-in 1 standard.

### Was there an impact on the reading performance of students who participated in Achieve 3000?

**Appendix B, Figure 5** (see page 10) shows student Lexile level by the number of activities completed. **Figure 5** provides a snapshot of Appendix B, Figure 5, and shows the Lexile level for all students who had access to Achieve 3000 and received a Lexile score, completed at least one activity, and completed at least 20 activities. As seen with student performance on the EOC English II exam, participation in activities increased student reading outcomes.

Two regression models measuring the impact of completing activities in Achieve 3000 on student Lexile levels are presented in **Appendix A, Table 2** (see page 7).

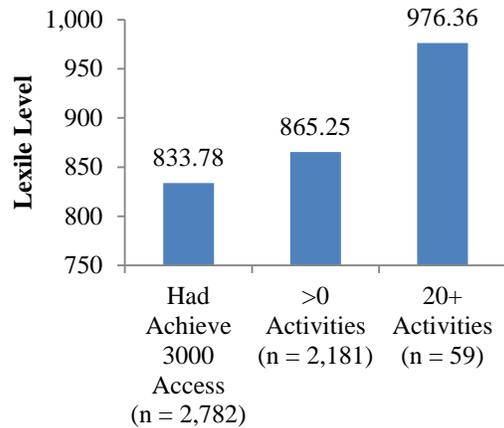


Figure 5. EOC English II Phase-in 2 Passing

Both regression test results showed a statistically significant positive effect of activities completed on the Lexile level at the  $p < 0.01$  level. Without controlling for school effects and student characteristics, the model showed a 10.8 point increase in Lexile level for each activity completed with an  $R^2$  of .02. This model explained 2% of the variance.

Once student characteristics and school attended were controlled, the effect reflects a 4.6 gain in Lexile level for each activity completed, with an  $R^2$  of .25. Therefore, the model then explained 25% of the variance.

Using the same calculations as the previous section, the district paid \$21.82 for each gain of 4.6 to the Lexile level per student.

## Conclusions

The data show that the Achieve 3000 program had a positive effect on reading outcomes for students that participated in this program and completed activities. However, current implementation fidelity is questionable. This limits the program's potential impact on student reading scores. Given that this is the first year of implementation, the program performed well for those students who utilized it for at least five activities. Future analysis is needed with full implementation.

The current cost per activity is relatively high compared to the benefit being derived. Regular classroom use and adherence to the minimum expected activity completion agreed upon before license distribution may greatly improve the cost-benefit of the program. Program implementation with fidelity targeting students who will benefit the most from the program should greatly improve tenth-grade EOC English II passing rates at the Phase-in 1 standard.

For additional information contact the HISD  
Department of Research and Accountability at  
713-556-6700 or e-mail [Research@Houstonisd.org](mailto:Research@Houstonisd.org).

## Appendix A: Tables

Table 1 Effect of Achieve 3000 on EOC English II Results										
Variables	Scale Score		Passing EOC English II Phase-in 1				Passing EOC English II Phase-in-2			
	(1)	(2)	(3)	MFX	(4)	MFX	(5)	MFX	(6)	MFX
Activities Completed	6.68*** (1.56)	2.96** (1.21)	.019*** (.004)	.008*** (.002)	.011** (.005)	.004** (.001)	.01** (.004)	.004** (.002)	.002 (.005)	.001 (.001)
<b>Controlled:</b>										
Student Characteristics	No	Yes	No	No	Yes	Yes	No	No	Yes	Yes
High School	No	Yes	No	No	Yes	Yes	No	No	Yes	Yes
N	4,148	4,148	4,148		4,148		4,148		4,148	
R-Squared	0.004	.51	.0038		.26		.0011		.28	

Note: Standard errors are in parenthesis. Columns (1) and (2) are OLS regressions with EOC English II Scale Score as the dependent variable. Columns (3) and (4) are probit regressions with whether or not the student passed the EOC English II exam as the dependent variable. For a full table of results including student characteristic and high school outcomes, please contact the HISD's Department of Research and Accountability.

\*p<.10 \*\*p<.05 \*\*\*p<.01

Table 2 Effect of Achieve 3000 on Lexile Scores		
Variables	Lexile Score	
	(1)	(2)
Activities Completed	10.82*** (1.35)	4.63*** (1.45)
<b>Controlled:</b>		
Student Characteristics	No	Yes
High School	No	Yes
N	2,782	2,676
R-Squared	.02	.25

Note: Standard errors are in parenthesis. Columns (1) and (2) are OLS regressions with EOC English II Scale Score as the dependent variable. Columns (3) and (4) are probit regressions with whether or not the student passed the EOC English II exam as the dependent variable. For a full table of results including student characteristic and high school outcomes, please contact the HISD's Department of Research and Accountability.

\*p<.10 \*\*p<.05 \*\*\*p<.01

**Appendix B: Figures**

