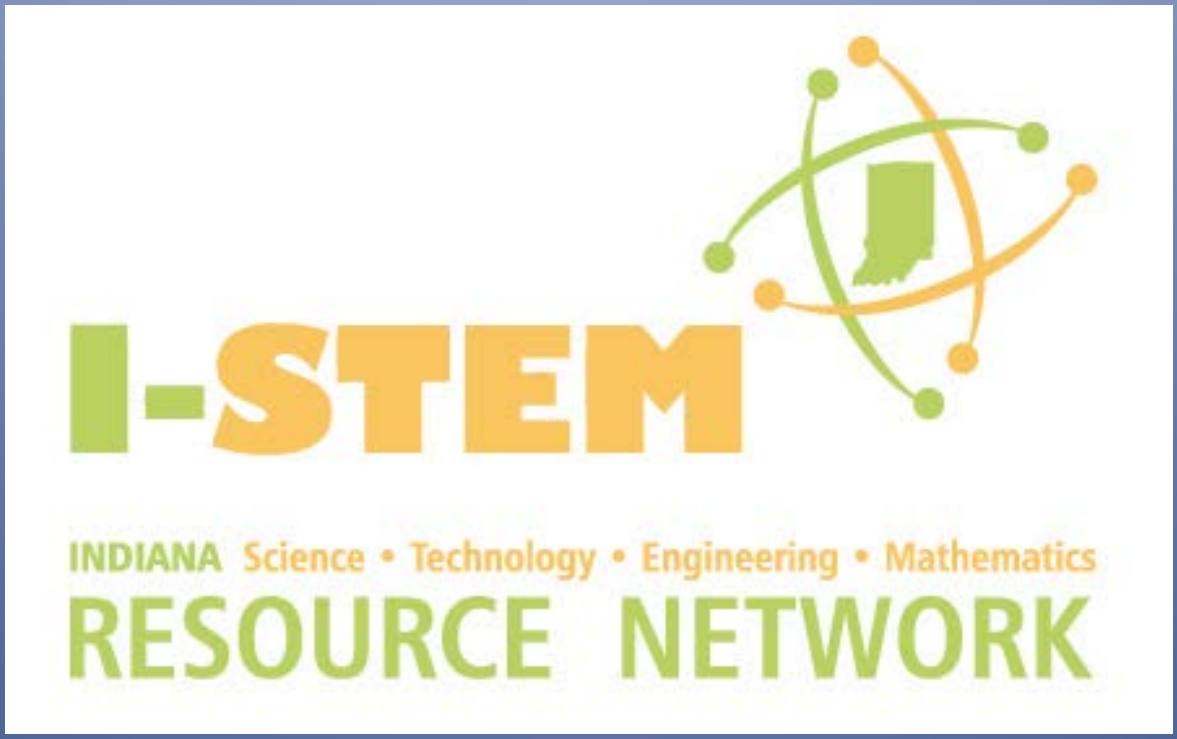
Report 2014-03r1



Indiana Science Initiative Update: The Impact of the Indiana Science Initiative on Students' ISTEP+ scores– TERC Evaluation Report (revised)

May 2014

The I-STEM vision is for Indiana to be a national leader in student achievement and to demonstratively improve college and career readiness in the STEM disciplines.

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STEM Education Evaluation Center at TERC:

Improving education through evaluation

Indiana Science Initiative

The Impact of the Indiana Science Initiative on Students' I-STEP+ scores

Evaluation Report

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The Impact of the Indiana Science Initiative on Students' ISTEP+ scores
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Introduction to the Study

The Indiana Science Initiative (ISI) focuses on improving instruction by providing teachers with research-based curricular materials (science kits) that support guided inquiry, and training them to use these kits effectively. ISI professional development and curricula at each grade level are aligned to state science standards, a notebooking process is integrated to support science practices as well as literacy, and mathematical ideas are explored in some of the science kits.

While measures that are closely aligned to the science kit investigations and to related classroom activities would be most sensitive to changes in student learning, the ISI team expected that once teachers gained sufficient experience via the Initiative, their students might show improvement through ISTEP+ scores as well. Therefore, the ISI team asked the project evaluators from TERC to measure:

- increases in student achievement for ISI students in science, English language arts (ELA), and mathematics.
- the extent to which ISI is supporting equity in these areas.

TERC generated the following research questions for which findings are provided in this report.

1. To what extent do students in ISI teachers' classrooms outperform students in non-ISI *matched* classrooms on:
    a. ISTEP+ science (grades 4&6)
    b. ISTEP+ English language arts (grades 3-8)
    c. ISTEP+ math (grades 3-8)

2. Is there a differential impact of ISI on ISTEP+ science, ELA, and mathematics scores when students:
    a. are non-white
    b. receive free/reduced lunch
    c. have exceptionalities (special education designations)
    d. have been identified as high ability
    e. are English language learners with low levels of proficiency

3. To what extent does ISI at different grade bands (elementary (Gr 3-5) or middle school (Gr 6-8)) influence student ISTEP+ scores in science, ELA, and mathematics?

Research Design and Methods

Our goal was to design as rigorous a study as possible so that increases or decreases in students' scores could be attributed to ISI, and so we could discern differences across grade bands and for student groups of interest (e.g., those who received free/reduced lunch). Because random assignment was not possible, (ISI teachers were already selected), the study employed a quasi-experimental design. The nature of the data, with students nested in classrooms led by teachers who were part of either the ISI intervention or the control group, required a hierarchical approach to data analysis (Raudenbush & Bryk, 2002). To examine the effect of the intervention on student achievement scores, a series of hierarchical linear models (HLM) were fit to student ISTEP+ data for the academic years ending in 2012 and 2013.

Data: The Indiana Department of Education (DoE) provided raw teacher and student data to the ISI Research Associate, as human subjects protections prohibited TERC evaluators from seeing any identifying or extra information. After receiving the data, the ISI Research Associate selected only the data that TERC required for the analyses, merged teacher and student data (so that the correct student data was linked to their classrooms/teachers), identified which teacher IDs were associated with ISI, and stripped all names from the set. He contacted the DoE when he identified irregularities in the data (e.g., there were, mistakenly, hundreds of students assigned to a single teacher) and corrected such problems before passing the data on to TERC.

Matching Procedure: According to the analysis plan, a control group needed to be drawn from a pool of Indiana teachers who did not participate in the ISI intervention. The best strategy for matching was to create a propensity score for each teacher through logistic regression. The following teacher variables were included in the logistic regression analyses: class size, proportion of non-white students, proportion of students with free/reduced price lunch, proportion of students with any exceptionality (i.e., teacher-reported learning disabilities), proportion of high ability students, proportion of ELL students, and number of years teaching.

These propensity scores were then used to conduct the matching procedure. Using the "MatchIt" software package in R, nearest neighbor matching was conducted (see Ho, Imai, King, & Stuart, 2011). By employing this method, we selected the best control match for each teacher in the treatment (ISI) group. Matches were pulled from the sample one at a time until a control group that was comparable to the treatment group was selected (See Appendix A for the MatchIt code written by TERC staff to select the control group).

Data sample: Through this process, 706 control group teachers were selected in 2012, matching an equal sized group of ISI teachers. There were a total of 44,478 students in this 2012 data set. For the 2013 data set, 864 control teachers were selected, matching an equal sized group of ISI teachers. There were a total of 55,303 students included in this 2013 data set.

After the matching procedure was completed, descriptive statistics were obtained for the intervention and ISI groups on demographic variables of means by condition, as shown in the table below. Independent samples t-tests revealed non-significant differences across the

treatment and control groups on reported demographics. From this, it was determined that an adequate control sample was obtained for further analysis using HLM.

Comparison of Demographic Variables for Control and Treatment (ISI) Groups (following Matching Procedure)

	Control Mean (SD)	Treatment (ISI) Mean (SD)	t (df)	p-value
Proportion Non-White	.46 (.33)	.46 (.30)	.145 (1410)	.88
Proportion Kids Who Receive Free/Reduced Price Lunch	.66 (.26)	.65 (.23)	1.10 (1410)	.27
Proportion of Students with Exceptionalities	.04 (.11)	.03 (.08)	1.40 (1410)	.16
Proportion of High Ability Students	.09 (.16)	.09 (.18)	-.89 (1410)	.37
Proportion of ESL Low Proficiency Students	.04 (.08)	.04 (.10)	-.32 (1410)	.75
Teacher Experience	13.24 (10.18)	13.32 (9.83)	-.167 (1410)	.87
Class size	30.66 (29.48)	32.34 (26.09)	-1.139 (1410)	.26

Analysis

We developed HLM models to measure the overall effect of the ISI intervention on all elementary students (grades 3-5 for ELA and math, grade 4 for science) and all middle school students (grades 6-8 for ELA and math, grade 6 for science). We included students' ISTEP+ scores from the previous year in ELA and math[1] as a variable in our models to account for baseline differences. Then, we ran subsequent models for each student group listed below, controlling for all other variables in the model except the one of interest. For instance, the model to measure the impact of being an ELL student in an ISI classroom "removes" the effects of race, free/reduced lunch status, having an exceptionality, and being high ability. Thus, we can see, statistically, just the impact of ISI on ELL students.

[1] For science this was not possible, because science testing is only conducted in 4th and 6th grades.

Since this study examines all ISTEP+ data by student group, we employed group designations identified by the Indiana Department of Education. Therefore, the following *student variables* were included in our models:

Race (coded as white (0) and nonwhite (1))
Free/Reduced Lunch (coded as no FRL (0) and yes FRL (1))
Exceptionality (coded as no exceptionality (0) and exceptionality (1))
High Ability (coded as no high ability (0) and high ability (1))
ELL Status (coded as medium to high proficiency (0) and low proficiency (1))
General (students who do not fall into any of the aforementioned groups comprise the *general* group, a label we employed for ease of interpretation).

We also included two *teacher variables* in our models:

ISI (coded as comparison (0) and ISI (1))
Grade (coded as middle school (0) and elementary school (1))

After running the HLM models, we noted significant interaction effects in the 2013 data set that warranted follow-up tests. To probe further, pairwise Wald tests were used to examine within grade and across demographic group differences for the 2013 data.

In the results section that follows, we report statistics for significant results related to the ISI intervention. Please see the statistical tables that are provided in the appendices for more detail.

Summary of Results and Discussion:

To understand ISI findings in context, it is essential that we report on ***the overall performance of all Indiana students included in this study***, irrespective of whether they are in an ISI or comparison classroom. Our analyses highlight what is typically seen in student assessment data—that students in groups that have higher needs and/or have generally been marginalized in the education process have lower scores. These are the very groups that concern the ISI team, and they remain a major focus of our evaluation. Thus, we note that in all subject areas of the 2012 and 2013 data sets, students in the non-white, free/reduced lunch status (FRL) exceptionalities, English language learners (ELL) groups frequently scored lower than those without such designations in *both the ISI and comparison classrooms*. For students classified as non-white, this pattern was identified only in science, and for ELL students this pattern was *not* identified in math. Furthermore, in science, we found that middle schools students in FRL, exceptionalities, and ELL groups were further behind than elementary students with the same designation.

Another factor to consider is the outcome measure—ISTEP+ scores—for this study. As this measure is one upon which decisions are often made, it was critical that we look for change in these scores. However, it is not a measure that is fully aligned with the ISI intervention. The Indiana Science Initiative focuses most heavily on science processes and content, and ISTEP+ only assesses this knowledge directly in grades 4 and 6. Furthermore, there are science skills and content covered in ISI teacher's classrooms that cannot be tested fully on a general science

test, and so it isn't possible to fully understand all that students have learned by looking at ISTEP+ scores alone. Therefore, it will be necessary to assess student growth via assessments more directly tied to what students have studied, and our plans for this are identified at the end of the report.

Lastly, this study of ISTEP+ scores is quite rigorous in nature. While it is instructive to look at trends via pre to post change data (without a comparison group) or by comparing scores of ISI schools to the state average, the results can be easily misconstrued as they do not allow one to attribute increases in student scores to ISI.

In contrast, the findings presented here are robust and *can be attributed to ISI*, and we identified ***several areas where ISI students outperform comparison students*** on the ISTEP+. These positive and statistically significant findings are itemized below.

Within the 2012 data set:

- On the Science ISTEP+: *Elementary students with exceptionalities* in ISI classrooms have significantly higher scores than students with exceptionalities in comparison classrooms (γ = 45.58, *SE* = 22.46 $t(535) = 2.03$, $p = <0.05$).

Within the 2013 data set:

- On the Science ISTEP+: *General elementary students*[2] in ISI classrooms have significantly higher scores than general elementary students in comparison classrooms ($x^2(1)=122.87$, $p<0.001$).

- On the Science ISTEP+: *High ability elementary students* in ISI classrooms have significantly higher scores than high ability students in the elementary comparison group ($x^2(1)=5.21$, $p<0.05$).

- On the Science ISTEP+: *Middle school students with FRL status* in ISI classrooms have significantly higher scores than their FRL peers in the comparison group ($\gamma = 5.14$, *SE* = 2.36 $t(693) = 2.18$, $p = <0.05$).
    - Furthermore, the gap between FRL middle school students and general middle school students in the ISI classrooms is closing ($x^2(1)=10.08$, $p<0.01$), indicating that they are gaining significant ground.

- On the Science ISTEP+: *ELL Middle school students* in ISI classrooms have significantly higher scores than their ELL peers in the comparison group ($\gamma = 25.75$, *SE* = 9.05 $t(693) = 2.85$, $p = <0.01$).

[2] Those students who do not fall into special groups identified by the Indiana Department of Education (non-white, receive free/reduced lunch, have an exceptionality that impacts learning, have a high ability designation, or are English language learners) make up another group that we have labeled *general* for ease of interpretation.

- Furthermore, the gap between ELL middle school students and general middle school students in the ISI classrooms is closing ($x^2(1)=13.73$, $p<0.01$), indicating that they are gaining significant ground.

- On the ELA ISTEP+: *General elementary students* in ISI classrooms have significantly higher scores than general elementary students in the comparison classrooms ($x^2(1)=5.704$, $p<0.01$).

- On the Math ISTEP+: *ELL middle school students* in ISI classrooms have significantly higher scores than middle school students in the comparison group ($\gamma = 16.59$, $SE = 5.92$ $t(1344)= 2.80$, $p = <0.01$).
    - Furthermore, the gap between ELL middle school students and general students in the ISI classrooms is completely closed ($x^2(1)=8.12$, $p<0.01$)—in fact, these ELL students *outperform* the general middle school students.

While the list of positive changes is notable, there were also groups of ***students in ISI classrooms who did not do as well as their comparison peers***. In 2012 we saw only one area where ISI students performed significantly lower—non-white elementary and middle school students in ISI classrooms have significantly lower Math ISTEP+ scores than their non-white peers in the comparison group. However, this negative effect for non-white students in math does not appear the following year. In 2013, there were significantly lower scores on Science ISTEP+ for ISI elementary students with greater needs (an exceptionality or who had FRL or ELL status) than the comparison group. At the middle school level, general and non-white students had significantly lower scores than comparison students. All other results showed neither significant positive or negative change.

This variability, showing gains as well as decreases, is not surprising. Often, adopting new curricula and instructional practices increases the demands on teachers and students. This may be the case with ISI. For some students, the ISI emphasis on higher level cognitive activities (e.g., analysis and synthesis) to build deeper conceptual understanding as well as new skills may require additional time before growth, as measured by a broad assessment like ISTEP+, can be realized. Still, in only a few years, the Indiana Science Initiative is having an impact and the ISI team is making progress toward improving educational equity for some students.

Moreover, our science findings indicate that middle schools students designated as FRL status, having exceptionalities, or being ELL were further behind than elementary students with the same designations. This may suggest that the cumulative impact on students who have not had adequate access to science education becomes more apparent by the time they reach 6th grade and take the science assessment. In response, a K-8 initiative may be necessary not only to improve elementary science, but also to lay an adequate foundation before students enter more formal science classes in middle school. It also underscores the potential of ISI when we look at the cases where middle school students made significant progress and began to close the gap.

Building from this and other ISI evaluation studies that TERC is conducting, we plan to:

- run an additional analysis using ISI data only (no control) that includes a "hours of PD" variable in the model. This will enable us to see how student ISTEP+ scores vary by the amount of ISI training teachers have had.
- run an additional analysis using ISI data only (no control) that includes teacher change scores in *personal science teaching efficacy* and *science teaching outcomes efficacy* as measured on the Science Teaching Efficacy Beliefs Inventory (STEBI). This will enable us to see whether there is a relationship between teacher increase/decrease in their sense of efficacy and their students ISTEP+ scores.
- conduct similar analyses (with a comparison group) of student learning as demonstrated on Acuity science assessments. Given that Acuity is a proximal measure of student learning (more directly tied to the science content and process that students studied), it may further illuminate where and to what extent ISI students are making progress.

References

Ho, D.E., Imai, K., King, G., & Stuart, E.A. (2011). MatchIt: Nonparametric Preprocessing for Parametric Causal Inference. Accessed October 21, 2013. http://cran.r-project.org/web/packages/MatchIt/MatchIt.pdf.

Raudenbush, S.W. & Bryk, A.S. (2002). Hierarchical Linear Models: Applications and Data Analysis Methods, 2nd Ed. Thousand Oaks, CA: Sage Publications.

Appendix A
Project MatchIt Code

MatchIt package downloaded: http://cran.r-project.org/web/packages/MatchIt/index.html

```
> require(foreign)
> test.data<-read.spss("/Users/heatherlavigne/Desktop/ISI.sav", use.value.labels=TRUE,
  to.data.frame=TRUE)
> names(test.data)
> m.out<-matchit(IS_ISI ~ PropScore, data = test.data, method="nearest")
> print(m.out)
> print(summary(m.out))
> plot(m.out)
> m.data <-match.data(m.out)
> write.csv(m.data, >file='/Users/heatherlavigne/Desktop/ISImatch.csv')
```

Appendix B
2012 ISI Student I-STEP Results

Table 1
Fixed Effects for Science I-STEP Model - 2012

Fixed Effect	Coefficent	SE	*t* Ratio (535 df)	*p* Value
For Average Teacher Means				
Intercept, γ_{00}	500.73	2.81	178.18	<.001
Intervention, γ_{01}	-5.89	3.95	-1.49	.14
Grade Level, γ_{02}	6.95	3.43	2.03	.04
Intervention x Grade, , γ_{03}	5.32	4.81	1.11	.27
For Non-white Student slope				
Intercept, γ_{10}	-19.70	2.38	-8.28	<.001
Intervention, γ_{11}	-0.64	3.40	-0.19	.85
Grade Level, γ_{12}	3.16	3.08	1.03	.31
Intervention x Grade, , γ_{13}	-1.89	4.33	-0.44	.66
For Free/Reduced -lunch slope				
Intercept, γ_{20}	-16.21	2.13	-7.62	<.001
Intervention, γ_{21}	2.14	3.14	0.68	.50
Grade Level, γ_{22}	-3.16	2.82	-1.12	.26
Intervention x Grade, , γ_{23}	-2.80	4.04	-0.69	.49
For Any Exceptionality slope				
Intercept, γ_{30}	-34.80	12.61	-2.76	.006
Intervention, γ_{31}	-21.68	16.94	-1.28	.20
Grade Level, γ_{32}	-8.89	15.80	-0.56	.57
Intervention x Grade, , γ_{33}	45.58	22.46	2.03	.04
For High Ability slope				
Intercept, γ_{40}	59.73	2.85	20.98	<.001
Intervention, γ_{41}	4.48	4.58	0.98	.33
Grade Level, γ_{42}	-3.60	4.22	-0.85	.40
Intervention x Grade, , γ_{43}	-2.78	6.19	-0.45	.65
For Low ESL slope				
Intercept, γ_{50}	-54.65	7.45	-7.34	<.001
Intervention, γ_{51}	7.99	12.06	0.66	.51
Grade Level, γ_{52}	13.63	8.92	1.53	.13
Intervention x Grade, γ_{53}	-3.35	14.21	-0.24	.81

Table 2
Variance Components for Science I-STEP Model - 2012

Random Effect	Variance Component	Standard Deviation	df	χ^2	*p* Value
Intercept, u_o	301.01	17.35	13	57.95	<.001
Non-white slope, u_1	63.49	7.97	13	16.46	.23
Free/Reduced-lunch slope, u_2	48.87	6.99	13	16.59	.22
Any Exceptionality slope, u_3	1997.71	44.70	13	48.26	<.001
High ability slope, u_4	74.27	8.62	13	17.67	.17
Low ESL slope, u_5	551.09	23.48	13	33.83	.002
Level-1 effect, *r*	2000.95	44.73			

Table 3
Fixed Effects for ELA I-STEP Model - 2012

Fixed Effect	Coefficent	SE	*t* Ratio (1039 df)	*p* Value
For Average Teacher Means				
Intercept, γ_{00}	509.01	1.37	371.58	<.001
Intervention, γ_{01}	1.73	1.91	0.91	.36
Grade Level, γ_{02}	-4.61	1.70	-2.71	.01
Intervention x Grade, , γ_{03}	-3.55	2.35	-1.51	.13
For 2011 ELA slope				
Intercept, γ_{10}	0.83	0.01	65.72	<.001
Grade Level, γ_{11}	-0.08	0.02	-5.23	<.001
For Non-white Student slope				
Intercept, γ_{20}	-1.84	1.03	-1.78	.08
Intervention, γ_{21}	0.92	1.48	0.62	.54
Grade Level, γ_{22}	1.40	1.42	0.98	.33
Intervention x Grade, , γ_{23}	-1.84	1.97	-0.92	.35
For Free/Reduced -lunch slope				
Intercept, γ_{30}	-6.03	0.93	-6.48	<.001
Intervention, γ_{31}	1.82	1.33	1.37	.17
Grade Level, γ_{32}	1.05	1.33	0.79	.43
Intervention x Grade, , γ_{33}	-1.91	1.84	-1.04	.30
For Any Exceptionality slope				
Intercept, γ_{40}	-13.64	4.68	-2.91	.004
Intervention, γ_{41}	-1.03	6.27	-0.16	.87
Grade Level, γ_{42}	-3.80	6.36	-0.60	.55
Intervention x Grade, , γ_{43}	6.43	8.95	0.72	.47
For High Ability slope				
Intercept, γ_{50}	23.86	1.61	14.81	<.001
Intervention, γ_{51}	-1.02	2.43	-0.42	.67
Grade Level, γ_{52}	-4.72	2.47	-1.92	.06
Intervention x Grade, , γ_{53}	-1.46	3.46	-0.41	.68
For Low ESL slope				
Intercept, γ_{60}	-12.38	3.38	-3.66	<.001
Intervention, γ_{61}	-0.19	5.17	-0.04	.97
Grade Level, γ_{62}	4.05	4.20	0.96	.34
Intervention x Grade, γ_{63}	1.74	6.28	0.28	.78

Table 4
Variance Components for ELA I-STEP Model - 2012

Random Effect	Variance Component	Standard Deviation	df	χ^2	*p* Value
Intercept, u_o	133.07	11.54	30	68.64	<.001
ELA Baseline slope, u_1	0.03	0.16	32	184.72	<.001
Non-white slope, u_2	4.39	2.10	30	25.19	>.500
Free/Reduced-lunch slope, u_3	4.91	2.22	30	37.33	.17
Any Exceptionality slope, u_4	302.90	17.40	30	48.33	.02
High ability slope, u_5	46.74	6.84	30	38.30	.14
Low ESL slope, u_6	11.66	3.42	30	26.96	>.500
Level-1 effect, *r*	1105.88	33.25			

Table 5
Fixed Effects for Math I-STEP Model - 2012

Fixed Effect	Coefficent	SE	*t* Ratio (1041 df)	*p* Value
For Average Teacher Means				
Intercept, γ_{00}	526.45	1.86	283.55	<.001
Intervention, γ_{01}	2.28	2.59	0.89	.38
Grade Level, γ_{02}	-3.55	2.26	-1.57	.12
Intervention x Grade, , γ_{03}	-4.35	3.13	-1.39	.17
For 2011 Math slope				
Intercept, γ_{10}	0.79	81.63	81.63	<.001
Grade Level, γ_{11}	-0.10	-8.47	-8.47	<.001
For Non-white Student slope				
Intercept, γ_{20}	-0.67	1.07	-0.63	.53
Intervention, γ_{21}	-3.06	1.53	-2.00	.05
Grade Level, γ_{22}	-0.70	1.48	-0.47	.64
Intervention x Grade, , γ_{23}	2.15	2.06	1.05	.30
For Free/Reduced -lunch slope				
Intercept, γ_{30}	-5.55	0.92	-6.02	<.001
Intervention, γ_{31}	-0.11	1.32	-0.09	.93
Grade Level, γ_{32}	0.41	1.33	0.30	.76
Intervention x Grade, , γ_{33}	-0.62	1.84	-0.34	.74
For Any Exceptionality slope				
Intercept, γ_{40}	-10.61	5.27	-2.01	.04
Intervention, γ_{41}	-13.59	7.13	-1.91	.06
Grade Level, γ_{42}	-0.71	7.06	-0.10	.92
Intervention x Grade, , γ_{43}	4.15	9.86	0.42	.67
For High Ability slope				
Intercept, γ_{50}	15.16	1.58	9.59	<.001
Intervention, γ_{51}	0.79	2.32	0.34	.73
Grade Level, γ_{52}	3.12	2.43	1.29	.20
Intervention x Grade, , γ_{53}	-2.70	3.32	-0.81	.42
For Low ESL slope				
Intercept, γ_{60}	-5.18	5.10	-1.02	.31
Intervention, γ_{61}	-7.71	7.91	-0.98	.33
Grade Level, γ_{62}	-5.73	6.11	-0.94	.35
Intervention x Grade, γ_{63}	11.99	9.26	1.30	.20

Table 6
Variance Components for Math I-STEP Model - 2012

Random Effect	Variance Component	Standard Deviation	df	χ^2	*p* Value
Intercept, u_o	332.43	18.23	30	125.08	<.001
Math Baseline slope, u_1	0.01	0.12	32	129.89	<.001
Non-white slope, u_2	2.57	1.60	30	42.99	.06
Free/Reduced-lunch slope, u_3	2.65	1.63	30	24.96	>.500
Any Exceptionality slope, u_4	550.28	23.46	30	56.08	.003
High ability slope, u_5	54.65	7.39	30	50.47	.01
Low ESL slope, u_6	576.64	24.01	30	57.50	.002
Level-1 effect, *r*	1148.81	33.89			

Appendix C
2013 Student I-STEP Results

Table 1
Fixed Effects for Science I-STEP Model - 2013

Fixed Effect	Coefficent	SE	*t* Ratio (693 df)	*p* Value
For Average Teacher Means				
Intercept, γ_{00}	489.15	2.06	237.44	<.001
Intervention, γ_{01}	-10.08	3.13	-3.22	.001
Grade Level, γ_{02}	-51.91	2.59	-20.05	< .001
Intervention x Grade, , γ_{03}	13.13	3.78	3.47	.001
For Non-white Student slope				
Intercept, γ_{10}	-16.73	1.68	-9.96	<.001
Intervention, γ_{11}	-7.08	2.48	-2.86	.004
Grade Level, γ_{12}	3.44	2.21	1.56	.12
Intervention x Grade, , γ_{13}	5.14	3.14	1.64	.10
For Free/Reduced -lunch slope				
Intercept, γ_{20}	-17.91	1.55	-11.52	<.001
Intervention, γ_{21}	5.14	2.36	2.18	.03
Grade Level, γ_{22}	5.43	2.09	2.60	.009
Intervention x Grade, , γ_{23}	-4.40	3.01	-1.46	.15
For Any Exceptionality slope				
Intercept, γ_{30}	-28.53	2.93	-9.72	< .001
Intervention, γ_{31}	-1.59	4.34	-.37	.72
Grade Level, γ_{32}	12.91	3.69	3.49	.001
Intervention x Grade, , γ_{33}	-3.20	5.30	-.60	.55
For High Ability slope				
Intercept, γ_{40}	56.50	2.54	22.22	<.001
Intervention, γ_{41}	-.72	3.90	-.18	.85
Grade Level, γ_{42}	-15.41	3.35	-4.60	< .001
Intervention x Grade, , γ_{43}	2.04	4.97	.41	.68
For Low ELL slope				
Intercept, γ_{50}	-69.22	5.58	-12.41	<.001
Intervention, γ_{51}	25.75	9.05	2.85	.005
Grade Level, γ_{52}	34.63	6.96	4.98	< .001
Intervention x Grade, γ_{53}	-28.04	10.76	-2.61	.009

Table 2
Variance Components for Science I-STEP Model - 2013

Random Effect	Variance Component	Standard Deviation	df	χ^2	*p* Value
Intercept, u_o	232.25	15.24	69	134.39	<.001
Non-white slope, u_1	27.95	5.28	69	67.79	> .500
Free/Reduced-lunch slope, u_2	19.97	4.47	69	70.41	.43
Any Exceptionality slope, u_3	245.17	15.66	69	121.51	<.001
High ability slope, u_4	111.31	10.55	69	80.50	.16
Low ELL slope, u_5	326.82	18.08	69	80.10	.17
Level-1 effect, *r*	1548.42	39.35			

Table 3
Fixed Effects for ELA I-STEP Model - 2013

Fixed Effect	Coefficent	SE	*t* Ratio (1340 df)	*p* Value
For Average Teacher Means				
Intercept, γ_{00}	514.61	1.17	440.38	< .001
Intervention, γ_{01}	-.60	1.81	-.33	.73
Grade Level, γ_{02}	-6.33	1.53	-4.14	< .001
Intervention x Grade, , γ_{03}	1.94	2.24	.87	.39
For 2012 ELA slope				
Intercept, γ_{10}	.84	.01	70.29	< .001
Grade Level, γ_{11}	-.09	.01	-6/09	< .001
For Non-white Student slope				
Intercept, γ_{20}	-1.17	.88	-1.33	.19
Intervention, γ_{21}	-2.20	1.37	-1.60	.11
Grade Level, γ_{22}	-.68	1.27	-.54	.59
Intervention x Grade, , γ_{23}	1.18	1.83	.65	.52
For Free/Reduced -lunch slope				
Intercept, γ_{30}	-5.02	.80	-6.25	< .001
Intervention, γ_{31}	-1.11	1.24	-.89	.37
Grade Level, γ_{32}	-.72	1.21	-.60	.55
Intervention x Grade, , γ_{33}	1.31	1.73	.76	.44
For Any Exceptionality slope				
Intercept, γ_{40}	-12.19	1.57	-7.76	< .001
Intervention, γ_{41}	-1.22	2.34	-.52	.60
Grade Level, γ_{42}	5.00	2.12	2.36	.02
Intervention x Grade, , γ_{43}	-1.84	3.00	-.61	.54
For High Ability slope				
Intercept, γ_{50}	19.95	1.53	13.02	< .001
Intervention, γ_{51}	-1.95	2.47	-.79	.43
Grade Level, γ_{52}	-2.20	2.25	-.98	.33
Intervention x Grade, , γ_{53}	2.30	3.34	.69	.49
For Low ELL slope				
Intercept, γ_{60}	-9.98	3.06	-3.27	.001
Intervention, γ_{61}	1.92	5.42	.35	.72
Grade Level, γ_{62}	1.75	3.94	.45	.66
Intervention x Grade, γ_{63}	-.11	6.42	-.02	.99

Table 4
Variance Components for ELA I-STEP Model - 2013

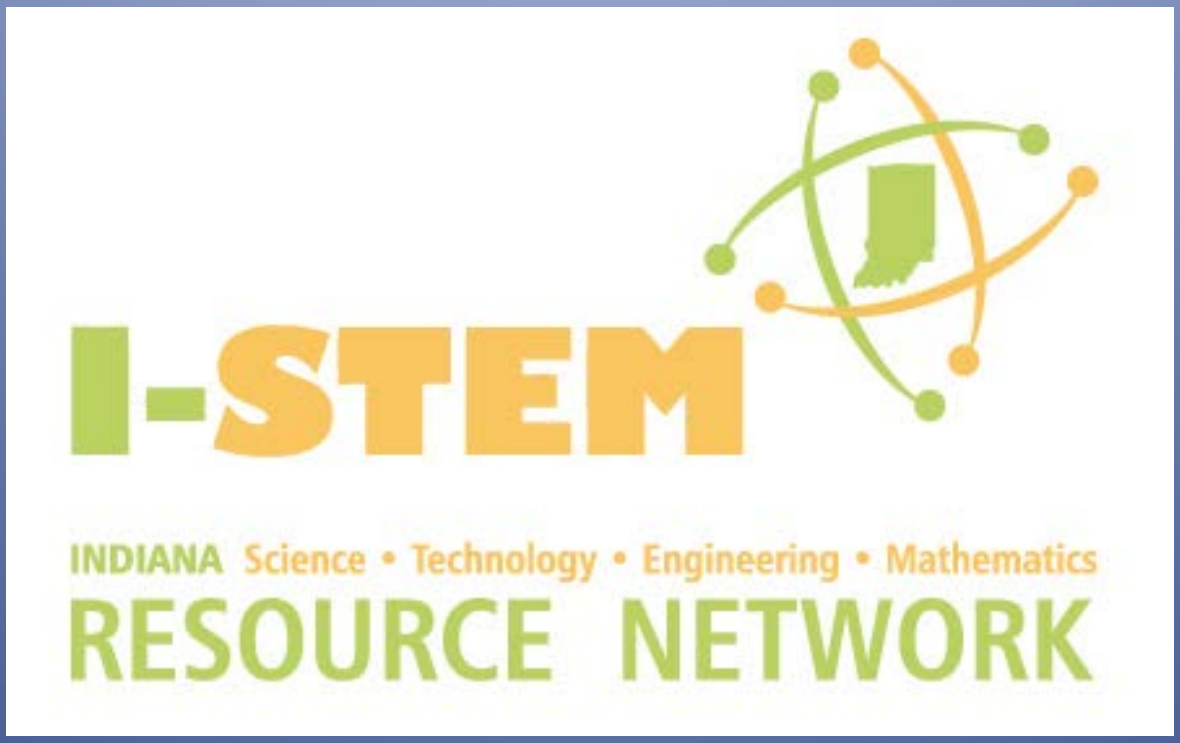
Random Effect	Variance Component	Standard Deviation	df	χ^2	*p* Value
Intercept, u_o	135.04	11.62	123	235.10	<.001
ELA Baseline slope, u_1	0.17	.03	125	527.03	<.001
Non-white slope, u_2	7.53	2.74	123	104.44	> .500
Free/Reduced-lunch slope, u_3	4.91	2.22	123	117.13	> .500
Any Exceptionality slope, u_4	67.49	8.22	123	124.20	.453
High ability slope, u_5	106.94	10.34	123	179.65	.001
Low ELL slope, u_6	19.33	4.40	123	121.63	> .500
Level-1 effect, *r*	1142.44	33.80			

Table 5
Fixed Effects for Math I-STEP Model - 2013

Fixed Effect	Coefficent	SE	*t* Ratio (1344 df)	*p* Value
For Average Teacher Means				
Intercept, γ_{00}	530.10	1.55	341.36	< .001
Intervention, γ_{01}	-2.16	2.43	-.89	.37
Grade Level, γ_{02}	1.66	1.97	.84	.40
Intervention x Grade, , γ_{03}	4.60	2.92	1.57	.12
For 2012 Math slope				
Intercept, γ_{10}	.77	.01	89.80	< .001
Grade Level, γ_{11}	-.05	.01	-5.22	< .001
For Non-white Student slope				
Intercept, γ_{20}	-1.14	.91	-1.25	.21
Intervention, γ_{21}	-2.24	1.41	-1.59	.11
Grade Level, γ_{22}	-.57	1.32	-.43	.66
Intervention x Grade, , γ_{23}	.62	1.88	.33	.74
For Free/Reduced -lunch slope				
Intercept, γ_{30}	-3.32	.83	-4.01	< .001
Intervention, γ_{31}	-1.05	1.28	-.82	.41
Grade Level, γ_{32}	-2.22	1.25	-1.77	.08
Intervention x Grade, , γ_{33}	-.35	1.78	-.20	.85
For Any Exceptionality slope				
Intercept, γ_{40}	-8.91	1.83	-4.88	< .001
Intervention, γ_{41}	-1.15	2.74	-.42	.68
Grade Level, γ_{42}	2.97	2.39	1.24	.22
Intervention x Grade, , γ_{43}	-3.44	3.42	-1.00	.32
For High Ability slope				
Intercept, γ_{50}	16.61	1.48	11.20	< .001
Intervention, γ_{51}	-1.31	2.35	-.56	.57
Grade Level, γ_{52}	2.15	2.22	.97	.33
Intervention x Grade, , γ_{53}	2.70	3.24	.83	.41
For Low ELL slope				
Intercept, γ_{60}	-6.10	3.35	-1.82	.07
Intervention, γ_{61}	16.59	5.92	2.80	.005
Grade Level, γ_{62}	-.65	4.30	-.15	.88
Intervention x Grade, γ_{63}	-14.85	7.03	-2.11	.04

Table 6
Variance Components for Math I-STEP Model - 2013

Random Effect	Variance Component	Standard Deviation	df	χ^2	*p* Value
Intercept, u_o	318.49	17.85	136	440.04	<.001
Math Baseline slope, u_1	.01	.11	138	329.88	<.001
Non-white slope, u_2	7.79	2.79	136	139.51	.40
Free/Reduced-lunch slope, u_3	9.03	3.00	136	109.77	>.500
Any Exceptionality slope, u_4	187.98	13.71	136	193.43	.001
High ability slope, u_5	100.08	10.00	136	189.33	.002
Low ESL slope, u_6	195.92	14.00	136	167.66	.034
Level-1 effect, *r*	1145.80	33.85			



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