AN EVALUATION OF THE MATHEMATICS AND SCIENCE PARTNERSHIP GRANT TO LAURENS SC SCHOOL DISTRICT 55

(STEM Teacher Preparation Project Phase 2)

October 1, 2015-Sept. 30, 2016

PREPARED FOR LAURENS SCHOOL DISTRICT 55

BY

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EXECUTIVE SUMMARY

Laurens County (SC) School District 55 received a three year Mathematics and Science Partnership (MSP) Grant from the SC Department of Education which ended on September 30, 2013. The District was successful in receiving another MSP grant which began on October 1, 2013. The new grant funded project, called STEM Teacher Preparation Project Phase II, includes as partners Laurens School District 56, Western Piedmont Education Center (WPEC), the S^2TEM Centers, the Upper Savannah Education Center, the Clemson University Extension Service and the Joe Adair Center. The goal of the project is to improve teacher understanding of STEM instruction and the interconnectedness among the disciplines of science, technology, engineering, and mathematics.

The purpose of the evaluation is to provide information which will assist the project staff in meeting the goals of the STEM Teacher Preparation Project Phase II after the grant has ended and help assure the continuing improvement of the project. The evaluation includes a process evaluation, outcome evaluation, and measurement of the federal GPRA. The design of the process evaluation is descriptive-exploratory. The design of the outcome evaluation is quasi-experimental.

The new project follows the same basic design strategies of the original MSP project with modifications designed to encourage innovation in instructional strategies that emphasize the interconnectedness among the disciplines of science, technology, engineering, and mathematics. The design includes five levels of professional development. These five levels are: graduate credit course; mini-courses; school based training during regular staff development times; specialized training for lead teachers and instructional coaches; and the Summer Institute. In this way every math and science teacher in each district is reached in some way, with maximum impact being on project participants choosing activities that best assist targeted activities in individual classrooms.

During the 2015-2016 grant year, which includes the 2015-2016 school year and the summer of 2016, 295 teachers and staff participated in professional development offered by the project. Of the 264 teachers and staff from Laurens 55, 173 (65.5%) teach students in grades kindergarten through fifth (elementary), 42 (15.9%) teach students in grades six through eight (middle), 41 (15.5%) teach students in grades nine through twelve (high), three (1.1%) teach students in the alternative school and five (1.9%) are school administrators or district staff. Of the 31 teachers and staff from Laurens 56, 20 (64.5%) teach students in grades kindergarten through fifth (elementary), three (9.7%) teach students in grades six through eight (middle), four (12.9%) teach students in grades nine through twelve (high) and four (12.9%) are school administrators or district staff.

In 2015-2016, there were approximately 6018 students enrolled in nine schools in Laurens 55 School District. More than half of the students in the district (55.7%) are White, 32.8% are African American, 10.9% are Hispanic, and 0.6% are of another race. Seventy percent of the students receive free or reduced price meals.

In 2015-2016, there were approximately 3,104 students enrolled in six schools in Laurens 56 School District. More than half of the students in the district (54.2%) are White, 40.1% are African American, 5.1% are Hispanic, and 0.7% are of another races. One hundred percent of the students receive free or reduced price meals.

Laurens Districts 55 and 56 closely followed their implementation plan. The project provided all five levels of professional development called for in the plan. A total of 37 professional development events were provided to 295 teachers and staff. The 295 teachers and staff received 15,524 hours of professional development, for an average of 52.62 hours of professional development per participant

The project was implemented quite effectively. The project management team and instructional coaches were flexible in adjusting specifics to achieve the planned activities of the project. This included changes to the Summer Institute and specific partners. All of the activities were achieved at or above the degree planned.

It is not possible to compare three through eighth grade baseline math assessment scores to any of the subsequent years of the grant because the state test for math was changed each year for the three grant years. The math assessment scores are reported for information

All of the outcome measures regarding improvements in teacher professional development, teacher content knowledge and teacher instructional skills were met or progress is being made towards meeting them. The measurement of teacher content knowledge was somewhat hampered by fewer teachers than is optimal taking the pre-post knowledge test.

There has been a steady decline in the standardized test scores of students which are available in both District 55 and 56 on standardized tests over the last three years. In one case (Algebra End of Course test), the decline between 2014 and 2015 and 2015 and 2016 for District 56 is statistically significant. The program is therefore not meeting the objective of improving standardized test scores at this time.

The project was implemented quite effectively. The project management team and instructional coaches were flexible in adjusting specifics to achieve the planned activities of the project. This included changes to the Summer Institute and specific partners. All of the activities were achieved at or above the degree planned.

With one exception, all of the outcome measures regarding improvements in teacher professional development, teacher content knowledge and teacher instructional skills were met or progress is being made towards meeting them. The measurement of teacher content knowledge was somewhat hampered by fewer teachers than is optimal taking the pre-post knowledge test.

It was not possible to report on the districts objective of narrowing the achievement gap between the state Annual Measurement Objective (AMO) and the average scale score for special needs students due to this data not being available from the state at the time of the writing of this report. However, the districts did meet this objective in 2014-2015.

For 2014-2015, The analysis of the comparison among three groups of teachers ("intensive" project activities (summer institute and/or graduate courses), "light" project activities (district mini courses, coaching, and other district-provided professional development), and "none" of the project activities indicates that students whose teacher participated in any project activities are more likely to score met, whereas students whose teacher did not participate are more likely to score either not met or exemplary. The differences in test scores are not what would be expected when comparing the intensive, light and no project activities groups. To estimate the combined impact of the student variables, teacher data, and teacher participation on student achievement on the 2015 Science PASS test, multiple linear regression estimation was conducted.

Taken together with the differences in student demographics across groups, it appears that participation in intensive project activities does not have a significant influence because these teachers are more likely to teach students who are White, are not receiving free or reduced lunch, and are in middle school, and these students traditionally have higher test scores to begin with and see less change in their scores year over year. African American students whose teacher participates in intensive activities see an average decrease in scores of 14.1 points whereas African American students whose teacher participates in light activities see an average increase in scores of 4.5 points and African American students whose teacher participates in no activities sees an average decrease in scores of 1.8 and this interaction accounts for 8% of the variation in test scores.

For 2015-2016 analysis of a comparison between outcomes for students of teachers, teachers were divided into two groups according to their level of participation in project activities. For purposes of this analysis, teachers were grouped according to the amount of participation in terms of professional development hours. "Intensive" levels of professional development were coded as 100 or more hours, "Light" levels of professional development included 0-99 hours. Most of the teachers were teaching in elementary school.

Students whose teacher participated in 100 or more hours of project activities were more likely to score met or exemplary on the science PASS, whereas students whose teacher participated in 0-99 hours were more likely to score not met. An analysis of average scale scores also indicates that students of teachers with intensive participation have a higher average score than students of teachers with 0-99 hours of participation and the differences are statistically significant.

These differences could be attributable to variations among the students of the two groups of teachers. The proportion of students who are White is significantly higher for teachers who participated in intensive activities (62.5% of students taught by teachers in intensive activities are White compared to 56.7% of students taught by teachers in light activities) There were no significant differences between the groups in students' gender or IEP status; however, there was a significant difference in the proportion of gifted and talented students served by teachers with intensive training (17.2%) versus light training (11.7%). However, after taking these differences into account, having a teacher that participated in more intensive training resulted in a 6.7 point increase on student test scores.

Overall, there were no observed differences in outcome achievement between Laurens District 55 and Newberry School District that were greater than differences observed during the baseline year, with the exception of the Algebra EOC, for which the outcomes declined.

It is recommended that the project staff continue the flexibility exhibited in the implementation of the project, that there be a review of the decline in student assessment scores, and that there be a review of the decline in participation in professional development in District 56. It is further recommended that the project staff examine the self-selection process of teachers who take advantage of professional development opportunities to determine whether project activities lend themselves better to teachers who are teaching certain subjects or classrooms that do not reach African Americans and the less affluent.

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INTRODUCTION

The Purposes and Goal of the Project

Laurens County (SC) School District 55 received a three year Mathematics and Science Partnership (MSP) Grant from the SC Department of Education which ended on September 30, 2013. The District was successful in receiving another MSP grant which began on October 1, 2013. The new grant funded project, called STEM Teacher Preparation Project Phase II includes as partners Laurens School District 56, Western Piedmont Education Center (WPEC), the S^2TEM Centers, the Upper Savannah Education Center, the Clemson University Extension Service and the Joe Adair Center. The goal of the project is to improve teacher understanding of STEM instruction and the interconnectedness among the disciplines of science, technology, engineering, and mathematics.

The project addresses the STEM professional development needs of approximately 350 teachers in the two Laurens County School Districts. The project also includes:

1. Activities leading to the development and collaboration of whole school mathematics and science content-focused vertical teams and whole school vertical teams across feeder systems.
2. Activities addressing and leading to teacher understanding and application of instructional strategies to close identified student subgroup achievement gaps in mathematics and/or science are part of the project.
3. Activities leading to the expansion or development and implementation of coherent, rigorous STEM curriculum connecting to state standards are part of the project.

Project Strategies

The new project follows the same basic design strategies of the original MSP project with modifications designed to encourage innovation in instructional strategies that emphasize the interconnectedness among the disciplines of science, technology, engineering, and mathematics. The design includes five levels of professional development. These five levels are: graduate credit courses; mini-courses; school based training during regular staff development times; specialized training for lead teachers and instructional coaches; and the Summer Institute. In this way every math and science teacher in each district is reached in some way, with maximum impact being on project participants choosing activities that best assist targeted activities in individual classrooms.

Objectives and Performance Measures of the Project

There are three objectives for the project. Each is an outcome objective. The objectives are:

Objective 1; Increase and improve STEM related professional development targeted toward increasing teacher content knowledge and instructional skills.

By June 2014, increase the number of days of professional development for L55 to 17 days and increase L56 to 10 days. By September 2016, increase the number of teachers with advanced degrees by 3 points (L55 = 63.8%, L56 = 61.2%)

By June 2016, 90% of participating teachers will use at least two STEM instructional strategies during documented observations. (90% of 350 teachers = 315 teachers)

By June 2016, 90% of participating teachers will demonstrate increased STEM content knowledge as demonstrated by pre and post scores on a valid and reliable instrument.

Objective 2: Improve student achievement on standardized tests

In each year of the program, the percentage of students in each district who score met or above on the math and science state assessments and who pass the math and biology EOC will improve by 2 points.

Objective 3: Narrow GAP of sub groups

In each year of the program, each district will narrow the achievement gap between the state Annual Measurement Objective (AMO) and the average scale score for special needs students by 5 points.

GPRA

In addition, the project seeks to meet the Government Performance and Results Act (GPRA) measures established by the federal government for MSP grants. These are:

1. GPRA Measure 1: The percentage of teachers who significantly increase their content knowledge in mathematics and science, as reflected in project-level pre-and post-assessments.
2. GPRA Measure 2: The percentage of students in classrooms of MSP teachers who score at the basic level or above in state assessments of mathematics or science.
3. GPRA Measure 3: The percentage of students in classrooms of MSP teachers who score at the proficient level or above in state assessments of mathematics or science.
4. GPRA Measure 4: The percentage of MSP projects that report using experimental or quasi-experimental design for their evaluations.
5. GPRA Measure 5: the percentage of MSP projects that use experimental or quasi experimental design for their evaluations that are conducted successfully and that yield scientifically valid results.

Planned Project Activities

The following were the activities planned for the third year of the project.

Clemson University and Presbyterian College will be contracted to provide graduate courses for teachers in STEM content and pedagogy. The math and science departments of Presbyterian College and the Western Piedmont Education Consortium (WPEC) will be contracted as consultants to develop and deliver mini courses to participant teachers. These activities will be coordinated by science coaches and lead teachers in both districts.

Each district will contract with providers for district and school based professional development. At least five STEM related mini-courses will be offered each semester. These courses will include four to six content hours of instruction for teachers. Opportunities for teachers to learn how to use research-based programs and strategies to facilitate learning will be designed to increase specific content knowledge or instructional skills. Course content will include innovative applications of instructional technology, vertical teams for math, science and engineering curriculum articulation, investigations of college and career readiness related to STEM content in grades preK-12 and alignment of STEM content and curriculum with State Academic Standards. A calendar of mini-course offerings will be published in each district by mid-September and courses will begin in October. Additional mini-course sessions will be taught beginning in January and March.

During the month of August the project manager will publish a list of regional STEM training opportunities for lead teachers and instructional coaches. These opportunities will be focused on building institutional capacity to sustain the project after the grant period. Each of the participating districts has identified lead staff to be trained. Training opportunities will include state technology, mathematics and science conferences, iSTEM Vertical Team training (two days in the early fall and one day each month) and other opportunities designed to build STEM instructional leaders at the district level. Lead teachers will use the knowledge gained in these courses as a foundation for the planning and implementation of district and school level professional development. All math and science teachers will be required to participate in training provided during staff development release time, afterschool activities and during teaching cluster planning times.

In late October the instructional coaches and the project leadership team will begin the process for planning summer STEM training particularly the Summer Institute. Based on recommendations of the evaluations from previous years, the Institute will focus on connecting the “real world” of technological and industrial work to the classroom. The summer program will include 100 contact hours and be taught for two weeks separated by about six weeks. The Institute will include a requirement for participants to provide follow-up training during the academic year in the form of mini-courses or single session trainings for vertical team members within the schools. Follow-up participation will be conducted in three or more classroom sessions

The project data collection and reporting team will work with evaluators to complete first semester reporting as required by the funder. During the months of September and October 2016, data will be analyzed and reporting will be accomplished as required by funders.

Purpose and Contents of the Evaluation

The purpose of the evaluation is to provide information which will assist the project staff in meeting the goals of the STEM Teacher Preparation Project Phase II after the grant has ended and help assure the continuing improvement of the project. The evaluation includes a process evaluation, outcome evaluation, and measurement of the federal GPRA. The design of the process evaluation is descriptive-exploratory. The design of the outcome evaluation is quasi-experimental.

METHODOLOGY

Evaluation Design

The findings of the evaluation of the first MSP Grant and the second year of the second MSP Grant have been applied to plan and improve performance, as well as help the project managers in modeling teachers' training opportunities. The evaluation will build upon the successes of the previous evaluations and expand its scope to determine if the project is impacting teacher pedagogy and if those changes lead to changes in student academic achievement.

Using an action research approach, the evaluation is a continuous process with the evaluators providing information to the program, the administrators of the grant, and key staff. The information is used to improve the project and is intended to help assure success. SWS is conducting both a process and outcome evaluation. The process evaluation assesses the process of the implementation of the project and the outcome evaluation measures the outcomes of the project.

The process evaluation is a descriptive-exploratory design. It consists of five steps: the implementation was divided into its constituent tasks and subtasks; each task and subtask was assigned measurements; quantitative data was entered directly into the MSP GEMS® information system described below, and the necessary data elements were included in the system; qualitative data was gathered through surveys, interviews of project staff, teachers and instructors, and direct observation of the Summer Institute.

The final step was to answer the following questions: 1) How do the activities conducted compare to the activities proposed? 2) How well does the actual timeline match the proposed timeline? 3) What impact did any changes to the plan have on the project's ability to achieve the objectives? This is an ongoing process with continuous communication of findings to the grant team. The communications are through scheduled face-to-face meetings, telephone calls, emails, and other direct contacts as necessary. Most importantly, the real-time reports produced by the MSP GEMS® provide on-going management, benchmark and similar information available to the project managers and teachers at an appropriate level at any time they chose to access it.

The outcome evaluation design is quasi-experimental. In 2014-2015, teacher and student achievement data is divided into three groups for comparison: teachers participating in the Institute or graduate courses (intensive participation), teachers participating in district professional development or coaching (light participation), and teachers not participating (comparison). In 2015-2016, the teacher and student achievement data is divided into two groups, those teachers and their students where the teachers took part in 100 hours or more of professional development and those teachers and their students who took part in 0 to 99 hours of professional development. Entry into the groups is through self-selection. If the comparison group teachers move into the experimental group or out of the district, they will be replaced in each year by other self-selected teachers. In each year, attrition rates will be monitored to ensure that at least 70% of the original sample is included in the analysis. If the attrition rate exceeds 15 points, the difference will be accounted for in the statistical analysis. Baseline equivalence of each group will be measured to

determine if significant differences in teacher credentials or demographics exist and any differences will be accounted for in the analysis. The outcome evaluation measures progress toward achieving the objectives to determine the overall impact of the project.

In year 2, the effect of each type of professional development activity offered (Summer Institute, graduate courses, and district-provided mini-courses) will be examined by comparing changes in teacher content knowledge, teacher instructional practices, and student academic achievement among each group of teachers. The same will occur in year 3 by quantity of professional development activity. Regression statistics will be used to account for differences in student demographics and teacher credentials and to measure the significance of the relationship. Finally, differences between achievement rates of Laurens students and Newberry County students will be analyzed to determine if differences in achievement are greater than what would normally be expected of students. It was presumed that Newberry would be a suitable comparison due to its geographic proximity and similarities in district policies, student demographics, and student academic achievement. The appropriateness of using Newberry County as a comparison is examined in the findings by evaluating differences in number of professional development days, number of teachers with advanced degrees, and other staff characteristics.

Objectives and Performance Measures

Objective 1: Increase and improve STEM related professional development targeted toward increasing teacher content knowledge and instructional skills.	
By June 2014, Increase the number of days of professional development for L55 to 17 days and increase L56 to 10 days.	Actual count from the 2013 academic year compared to the 2014 academic year.
By September 2016, Increase the number of teachers with advanced degrees by 3 points (L55 = 63.8%, L56 = 61.2%)	Actual count from the 2013 academic year compared to the 2016 academic year.
By June 2016, 90% of participating teachers will use at least two STEM instructional strategies during documented observations. (90% of 350 teachers = 315 teachers)	Observation utilizing the SWS Classroom Observation Instrument. Observations to occur at beginning of year and at end of school year.
By June 2016, 90% of participating teachers will demonstrate increased STEM content knowledge as demonstrated by pre and post scores on a valid and reliable instrument.	Valid and reliable instrument to be chosen in concert with instructors and scores entered into MSP GEMS®. Testing at beginning and end of school year. Scores will be matched by teacher.
Objective 2: Improve student achievement on standardized tests	

Each year of the program, the percentage of students in each district who score met or above on the state math assessment and science PASS and who pass the math and biology EOC will improve by 2 points.	Scores entered into MSP GEMS for all students. Science PASS data for 2013 and math assessment scores will be used as the baseline compared to the same data for succeeding years. PASS will be matched by student. EOC data will be gathered at the end of the academic year. *(Note that the state math assessment was changed each year of the grant making math score comparison impossible.)*
Objective 3 Narrow GAP of sub groups	
Each year of the program, each district will narrow the achievement gap between the state Annual Measurement Objective (AMO) and the average scale score for special needs students by 5 points.	Science PASS and state math assessment scores will be entered into MSP GEMS® for all students and special needs students will be used to measure the achievement gap which will then be compared to the AMO. *(Note that the state math assessment was changed each year of the grant making math score comparison impossible.)*

The annual outcome evaluation report will include a description of the project and its implementation; findings of the success toward meeting the objectives; findings of the quasi-experimental analysis; description of all findings in charts, tables, and a written form; and written conclusions and recommendations drawn from the findings. The evaluation will be presented to project team members and recommendations will be used to improve the project. SWS will assist in completing the interim, six-month report required by the SCDE and the LEA portions of the Annual Performance Review (APR) to the US Department of Education by providing the information from its evaluation work and from the MSP GEMS®.

GPRA Measures

The federal Government Performance and Results Act (GPRA) measures are reported on as they are stated in the Federal reporting system.

Information System

The project continued to use the MSP GEMS® online data system as the central point for data gathering, storage, initial statistical manipulation and routine reporting. The MSP GEMS® was modified as needed following a meeting among SWS and the two district staffs to determine changes necessitated by the new project. The process plan, database, surveys, protocols, reports, and other necessary information as identified are available through the system. Data was entered by project staff, and classroom activity observers. Student demographic and available academic achievement data was provided by the school districts and imported into the MSP GEMS® for analysis purposes. Classroom observation data were collected and entered directly into the MSP GEMS®, using an instrument developed for the project (See Appendix One for a copy of the observation instrument.)

Phases of the Evaluation

Phase 1 – Preparation for Data Gathering

In this phase, the grant application was reviewed, with a particular emphasis on the goals, objectives, outcomes and activities of the project. The evaluation design of the project was reviewed and questions prepared regarding availability of data, key informants and access to qualitative information.

The GEMS® online information system was modified to collect all the necessary information that could be captured in this manner. The evaluators worked with the Districts to assure appropriate pre and post test instruments, identification of the comparison group members, site visit dates and other technical details. On site interview schedules were prepared. Online forms of pre and post tests were developed. In addition, a classroom observation instrument was designed. (Copies of instruments may be found in Appendix One)

Individuals who enter data into the GEMS® were provided with user id's, passwords and training on using the system. Users only have access to their own data, or, in the case of administrators of the project, to the project's data. Project administrators do have access to summaries and de-identified records for teacher assessments, but do not have access to view the scores of any individual teachers.

Phase 2 – Gathering and Reviewing Information

Information gathering occurred in five stages. The first stage was to hold a series of meetings and conversations with the project manager and other project personnel. In these meetings, the data and other information needs of the project and of the evaluation were addressed and solutions assured.

The second stage was to test the instruments and the GEMS® system, then to train personnel who would use the GEMS®. Continuing technical assistance was also arranged.

The third stage was to monitor the data being entered into the system, make adjustments as necessary and to provide special reports or feedback to the project. Two site visits were also made to the project during each year of the grant. These were followed up with telephone interviews and email communications with members of the project management team.

The fourth stage was to access the standardized test score data for both Laurens County School Districts and the Newberry School District for the period under study. Standardized test score data (science PASS, state math assessment and EOCEP) for the Laurens School Districts and the comparison district were scheduled to be provided by the districts.

The fifth stage was a series of interviews with the participants in the Summer Institute and observation of the Institute activities during the second week of the Institute.

Phase 3 –Preparation of the Information and Data

The qualitative information gathered was placed in a single qualitative database for analysis. The quantitative data was exported from GEMS® into the Statistical Packages for the Social Sciences (SPSS) for analysis. Tables and Graphs describing the outcomes were developed in Microsoft Excel and exported to Microsoft Word.

Phase 4 – Analysis of Information and Data and Development of the Report

In developing the report, the following steps were conducted.

1. The evaluation team achieved consensus on:
    a. *What Happened?* (Findings of the Study) What activities and actions took place during the grant period?
    b. *So What?* (Conclusions of the Study) What meanings do the activities and the actions have in terms of the goal and objectives of the project and the expressed desires of the participants? To what extent have the aims of the project been achieved? Which activities were most successful? Which could be improved upon?
    c. *Now What?* (Recommendations of the Study) What changes and additions does the evaluation team believe might be useful in advancing the goals of the project?

2. The sections of the report were assigned to different team members for drafting and all team members edited the report.

3. The final report includes a description of the grant and its goals, strategies, objectives, and activities; process findings; findings of progress toward the project goals and objectives; the conclusions; and the recommendations. This resulted in a detailed written documentation of the progress of the project.

Limitations of the Evaluation

Since the state math assessment instrument was different for each year of the grant, evaluating changes in math scores for students was not possible. During the third year of the grant, Newberry School District did not provide teacher level student data, making it impossible to do the comparison of student progress by teacher among the three school districts (Laurens 55, Laurens 55 and Newberry).

FINDINGS PART I: PROCESS EVALUATION

Introduction

The process evaluation reports first on the numbers and makeup, to the extent possible, of the teachers and students served by the grant. It then reports on the progress made toward carrying out the activities included in the grant proposal.

Teachers Served

In Laurens County School District 55 in 2012-2013 there were 336 teachers (all subjects), of whom 56.8% had an advanced degree, 91.9% returned from the previous year, and who participated in an average of 13.4 professional development days. In Laurens County School District 56 in 2012-2013, there were 178 teachers (all subjects), of whom 59% had an advanced degree, 90.5% returned from the previous year, and who participated in an average of 11.6 professional development days.

During the 2013-2014 grant year, which includes the 2013-2014 school year and the summer of 2014, 344 teachers and staff participated in professional development offered by the project. Of the 254 teachers from Laurens 55, 99 (39%) teach students in grades kindergarten through fifth (elementary), 69 (27.2%) teach students in grades sixth through eighth (middle), 54 (21.3%) teach students in grades ninth through twelfth (high), 17 (6.7%) teach students in special education (all grade levels) or provide English as a second language support (one teacher), 12 (4.7%) are instructional coaches, and three (1.2%) are school administrators or district staff. Of the 86 teachers from Laurens 56, 58 (67.4%) teach students in grades kindergarten through fifth (elementary), 12 (14%) teach students in grades sixth through eighth (middle), six (7%) teach students in grades ninth through twelfth (high), four (4.7%) teach students in special education (all grade levels), three (3.5%) are instructional coaches, and three (3.5%) are school administrators or district staff. An additional four teachers who work outside of either district also participated. (See Table 1 and Figure 1.)

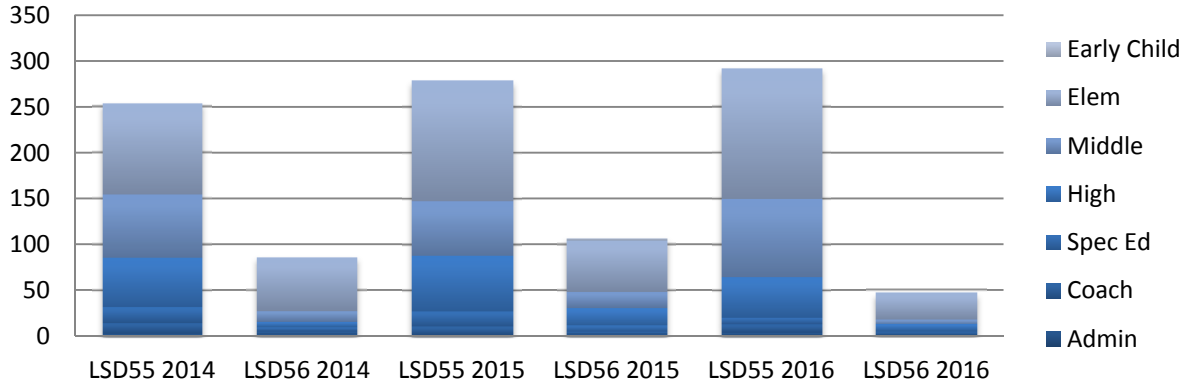
During the 2014-2015 grant year, which includes the 2014-2015 school year and the summer of 2015, 391 teachers and staff participated in professional development offered by the project.. Of the 279 teachers from Laurens 55, 132 (47.3%) teach students in grades kindergarten through fifth (elementary), 59 (21.1%) teach students in grades sixth through eighth (middle), 60 (21.5%) teach students in grades ninth through twelfth (high), 17 (6.1%) teach students in special education (all grade levels) or provide English as a second language support (one teacher), nine (3.2%) are instructional coaches, and two (0.7%) are school administrators or district staff. Of the 107 teachers from Laurens 56, two (1.9%) teach early childhood classes, 56 (52.3%) teach students in grades kindergarten through fifth (elementary), 18 (16.8%) teach students in grades sixth through eighth (middle), 19 (17.8%) teach students in grades ninth through twelfth (high), seven (6.5%) teach students in special education (all grade levels), two (1.9%) are instructional coaches, and three (2.8%) are school administrators or district staff. An additional five teachers who work outside of either district also participated. (See Table 1 and Figure 1.)

During the 2015-2016 grant year, which includes the 2015-2016 school year and the summer of 2016, 295 teachers and staff participated in professional development offered by the project. Of the 264 teachers and staff from Laurens 55, 173 (65.5%) teach students in grades kindergarten through fifth (elementary), 42 (15.9%) teach students in grades six through eight (middle), 41 (15.5%) teach students in grades nine through twelve (high), three (1.1%) teach students in the alternative school and five (1.9%) are school administrators or district staff. Of the 31 teachers and staff from Laurens 56, 20 (64.5%) teach students in grades kindergarten through fifth (elementary), three (9.7%) teach students in grades six through eight (middle), four (12.9%) teach students in grades nine through twelve (high) and four (12.9%) are school administrators or district staff. (See Table 1 and Figure 1.)

Table 1: Grade Level Taught by Participating Teachers

	2013-2014				2014-2015				2015-2016			
	LSD55		LSD56		LSD55		LSD56		LSD55		LSD56	
	#	%	#	%	#	%	#	%	#	%	#	%
Early Childhood	0	0.0%	0	0.0%	0	0.0%	2	1.9%	0	0%	0	0%
Elementary Grades	99	39.0%	58	67.4%	132	47.3%	56	52.3%	173	65.5%	20	64.5%
Middle School Grades	69	27.2%	12	14.0%	59	21.1%	18	16.8%	42	15.9%	3	9.7%
High School Grades	54	21.3%	6	7.0%	60	21.5%	19	17.8%	41	15,5	4	12.9%
Special Ed/ESOL	17	6.7%	4	4.7%	17	6.1%	7	6.5%				
Instructional Coach	12	4.7%	3	3.5%	9	3.2%	2	1.9%				
Administrative	3	1.2%	3	3.5%	2	0.7%	3	2.8%	5	1.9%	4	12.9%
Alternative School									3	1.2%		
Total	**254**	**100%**	**86**	**100%**	**279**	**100%**	**107**	**100%**	**264**	**100%**	**31**	**100%**

Figure 1: Grade Level Taught by Participating Teachers



Of the 239 Laurens 55 teachers who participated during the 2013-2014 grant year (after excluding instructional coaches, school administrators, and district personnel), 24 (10%) teach only math, 25 (10.5%) teach only science, 90 (37.7%) teach both math and science, 16 (6.7%) teach a technology

related course or are a media specialist, and 84 (35.1%) teach other subjects. Personnel categorized as 'Other' included support staff, guidance counselors, teachers who taught social studies, English language arts, music, the arts, and other related arts. (See Table 2 and Figure 2.)

Of the 80 Laurens 56 teachers who participated in 2013-2014 (after excluding instructional coaches, school administrators, and district personnel), two (2.5%) teach only math, six (7.5%) teach only science, 52 (65%) teach both math and science, and 20 (25%) teach other subjects. Personnel categorized as 'Other' included support staff, guidance counselors, teachers who taught social studies, English language art, music, the arts, and other related arts. (See Table 2 and Figure 2.)

Of the 268 Laurens 55 teachers who participated during the 2014-2015 grant year (after excluding instructional coaches, school administrators, and district personnel), 21 (7.8%) teach only math, 20 (7.5%) teach only science, 112 (41.8%) teach both math and science, 14 (5.2%) teach a technology related course or are a media specialist, and 101 (37.7%) teach other subjects. Personnel categorized as 'Other' included support staff, guidance counselors, teachers who taught social studies, English language arts, music, the arts, and other related arts. (See Table 2 and Figure 2.)

Of the 102 Laurens 56 teachers who participated in 2014-2015 (after excluding instructional coaches, school administrators, and district personnel), seven (6.9%) teach only math, five (4.9%) teach only science, 56 (54.9%) teach both math and science, one (1%) teaches a technology related course, and 33 (32.4%) teach other subjects. Personnel categorized as 'Other' included support staff, guidance counselors, teachers who taught social studies, English language art, music, the arts, and other related arts. (See Table 2 and Figure 2.)

Of the 259 Laurens 55 teachers who participated during the 2015-2016 grant year (after excluding district personnel) 16 (6.2%) teach only math, 15 (5.8%) teach only science, 173 (66.8%) teach both math and science, 11 (4.2%) teach a technology related course or are a media specialist, and 44 (17.0 %) teach other subjects. Personnel categorized as 'Other' included support staff, guidance counselors, teachers who taught social studies, English language arts, music, the arts, and other related arts. (See Table 2 and Figure 2.)

Of the 27 Laurens 56 teachers who participated in 2015-2016 (after excluding school administrators, and district personnel), five (18.5%) teach only math, two (7.4%) teach only science, and 20 (74.1%) teach both math and science. (See Table 2 and Figure 2.)

Table 2: Subjects Taught By Participating Teachers

	2013-2014				2014-2015				2015-2016			
	LSD55		LSD56		LSD55		LSD56		LSD55		LSD56	
	#	%	#	%	#	%	#	%	#	%	#	%
Mathematics Only	24	10.0%	2	2.5%	21	7.8%	7	6.9%	16	6.2%	5	18.5%
Science Only	25	10.5%	6	7.5%	20	7.5%	5	4.9%	15	5.8%	2	7.4%
Math and Science	90	37.7%	52	65.0%	112	41.8%	56	54.9%	173	66.8%	20	74.1
Media/Technology	16	6.7%	0	0.0%	14	5.2%	1	1.0%	11	4.2%	0	0.0%
Other	84	35.1%	20	25.0%	101	37.7%	33	32.4%	44	17.0%	0	0.0%
Total	**239**	**100%**	**80**	**100%**	**268**	**100%**	**102**	**100%**	**259**	**100%**	**27**	**100%**

Characteristics of Students in the District

In 2013-2014, there were approximately 5,992 students enrolled in nine schools in Laurens 55 School District. Laurens 55 has four elementary schools (grades K-5), two middle schools (grades 6-8), two schools serving elementary and middle (grades K-8), and one high school (grades 9-12). More than half of the students in the district (58.4%) are White, 31.1% are African American, 9.9% are Hispanic, and 0.7% are of other races. The majority of the youth (72%) receive free or reduced price meals. The attendance rate for students was 95.9%, the retention rate was 2.5%, 7.4% of students were older than usual for their grade, and 16.7% had a disability other than speech. The annual dropout rate was 4.1% and the four year cohort graduation rate was 79.7%.

In 2013-2014, there were approximately 3,093 students enrolled in six schools in Laurens 56 School District. Laurens 56 has one child development center, three elementary schools (grades K-5), one middle school (grades 6-8), and one high school (grades 9-12). More than half of the students in the district (54.6%) are White, 40.1% are African American, 4.6% are Hispanic, and 0.6% are of other races. The majority of the youth (76.4%) receive free or reduced price meals. The attendance rate for students was 97%, the retention rate was 1.9%, 4.9% of students were older than usual for their grade, and 17.8% had a disability other than speech. The annual dropout rate was 2.3% and the four year cohort graduation rate was 77.8%.

In 2014-2015, there were approximately 6,057 students enrolled in nine schools in Laurens 55 School District. More than half of the students in the district (56.7%) are White, 32.4% are African American, 10.2% are Hispanic, and 0.6% are of other races. The majority of the youth receive free (65.3%) or reduced price (27.1%) meals.

In 2014-2015, there were approximately 3,077 students enrolled in six schools in Laurens 56 School District. More than half of the students in the district (53.8%) are White, 40.4% are African American, 5.1% are Hispanic, and 0.7% are of other races. The majority of the youth receive free (70%) or reduced price (22.6%) meals.

In 2015-2016, there were approximately 6018 students enrolled in nine schools in Laurens 55 School District. More than half of the students in the district (55.7%) are White, 32.8% are African American, 10.9% are Hispanic, and 0.6% are of another race. Seventy percent of the students receive free or reduced price meals.

In 2015-2016, there were approximately 3,104 students enrolled in six schools in Laurens 56 School District. More than half of the students in the district (54.2%) are White, 40.1% are African American, 5.1% are Hispanic, and 0.7% are of other races. One hundred percent of the students receive free or reduced price meals.

Description of Implementation of the Project

The Laurens County STEM Project is designed to improve teacher understanding of STEM instruction and the interconnectedness among the disciplines of science, technology, engineering, and mathematics. The target population is teachers at all levels who teach math and science. The

project proposed to implement this design by carrying out seven activities. These activities and the extent to which they were carried out are as follows.

1. Beginning as soon as the project is refunded partners will meet to begin activities. Contracts will be established with Institutes of Higher Learning. These activities will be coordinated by science coaches and lead teachers in both districts.

   The meetings did occur and activities were established, conducted and coordinated by the science coaches and lead teachers. In the first year of the grant, the leadership team was not able to fill an educational technology cohort, the decision was made and approved to change to a math and science content cohort. This necessitated contracting with a different provider which developed courses specifically to meet the needs of the project. The provider is the Western Piedmont Education Consortium (WPEC) which in turn contracts with Clemson University to provide the courses. The coursework began in the summer of 2014 and continued during 2015-2016. On completion of all coursework, the cohort members will receive a master's degree in teaching math or science.

2. Each district will contract with providers for district and school based professional development. At least 5 STEM related mini-courses will be offered each semester. These courses will include 4 to 6 content hours of instruction for teachers.

   Nineteen STEM related mini-courses of one to 15 hours each were offered. Providers included WPEC, the S^2TEM Centers, Clemson University, Presbyterian College and internal district personnel.

3. A calendar of mini-course offerings will be published in each district by mid-September and courses will begin in October. Additional mini-course sessions will be taught beginning in January and March.

   The mini-course offerings were published and the first course held beginning September 24, 2015. Courses were offered throughout the school year and the summer.

4. During the month of August the project manager will publish a list of regional STEM training opportunities for lead teachers and instructional coaches.

   *Information on district, regional and national opportunities for lead teachers and instructional coache*s *was provided. These personnel attended 16 STEM district, regional and national opportunities.*

5. In late October the instructional coaches and the project leadership team will begin the process for planning summer STEM trainings. Based on recommendations of the evaluations from the previous MSP project, the rigor of the summer program will be increased. The summer program will include 100 contact hours and be taught for 2 weeks. The focus for the summer of 2016 will continue the theme of environment science and will focus the attention of vertical teams of teachers on exploration of Water: Filtration, Quality, & Habitats

The instructional coaches and project leadership team began planning in September 2015 for the summer STEM training. The goal of this year's Institute was to tie the classroom experience of students to the needs of today's employers. To do this, the teachers were first given background on the present and future needs of high paying employers and a structure for understanding those needs and how to meet them. The emphasis of the Institute was on connecting the classroom to the work place by taking field trips which illustrate 21st Century employment (while concentrating on the specific area of Water: Filtration, Quality, & Habitats) and then reflecting on how to bring the needs of employers into the classroom.

6. The project data collection and reporting team will work with evaluators to complete first semester reporting as required by the funder. During the months of September and October 2016, data will be analyzed and reporting will be accomplished as required by funders. Planning for year three of the project will be completed during the months of July and August.

   The first semester reporting occurred on schedule. Data was analyzed in September and October as it became available. Planning was conducted in July and August and was revisited as necessary.

Description of Implementation of Professional Development

As stated in the Introduction, there are five levels of professional development offered by the project. In this section of the evaluation, each of the types of professional development is described. Additional information regarding the implementation of the professional development is also provided. A complete listing of professional development activities with descriptions may be found in Appendix Two.

Table 3: Professional Development by Type 2015-2016

Training Type	Trainings Completed			Trainings in Progress			Total for All Trainings		
	# Trainings	# Staff	# Hours	# Trainings	# Staff	# Hours	# Trainings	# Staff	# Hours
Summer Institute	1	73	8100	0	0		**1**	**73**	**8100**
Graduate Course	5	60	4620	0	0		**5**	**60**	**4620**
District Professional Development (including mini-courses)	25	204	2576	0	0		**25**	**204**	**2576**
Conference	6	15	228	0	0		**6**	**15**	**228**
Total	**37**	**295**	**15524**	**0**	**0**		**37**	**295**	**15524**

The Summer Institute

The most intensive professional development is provided in the Annual Summer Institute. The Institute is designed to provide STEM teachers with a rigorous summer experience that will motivate innovation. Follow-up activities require the participants to teach a mini-course and to apply what was learned in the summer experience within classrooms across both districts. The planning team for the Institute develops and experience that will be life changing for STEM instructors. Seventy-three teachers and staff who participated in both weeks received a total of 100 contact hours. The 73 teachers who participated in the Summer Institute received a total of 8,100 hours of experience over a two week period, (an average of 110 hours per person). The Summer Institute schedule may be found in Appendix Three.

The Summer Institute was largely developed and taught by lead teachers from the partnering districts. To prepare for this, the lead teachers were given extensive professional development training, including: several days of training with the Western Piedmont Education Consortium, Furman University and others on specific STEM related teaching methods; state and national conferences focused on STEM content and pedagogy; and 15 hours of training to learn strategies for teaching engineering practices in k-12 classrooms taught by the S^2TEM center. Brenda Schrantz, Coordinator of Assessment and Accountability for Laurens District 33, assisted with supervision of the Institute development and implementation. Mr. Jody Penland, project manager and Director of Federal Programs and Professional Development for Laurens District 55, coordinated planning sessions and worked with teachers to insure fidelity with trainings. The lead teachers worked with Mr. Penland to arrange field experiences including a trip to Camp Fellowship on Greenwood Lake, the South Carolina Aquarium in Charleston, the Charleston harbor and a barrier island, the Oceanography Center at the Institute of History, Science and Technology of Patriots Point in Charleston.

The goal of this year's Institute was to tie the classroom experience of students to the needs of today's employers. The specific area the Institute examined was Water: Filtration, Quality, & Habitats. To do this, the teachers during the first week were given background and practical engineering knowledge on the quality of water and how to improve that quality. That included a field trip to examine the impact of water quality in a lake environment. This was followed by reflection and water quality and notebooking on what they had learned. The second week began with additional learning about the specifics of measuring water quality, then an examination of the impact the program has had on their classroom behavior. The last two days were spent in Charleston, SC, where several different opportunities to see the impact of water quality in the real world and the work associated with water quality were given.

Approximately 56 teachers attending the two day field trip to Charleston were interviewed by evaluation staff. The majority are white females, with only five males, one of whom was African American. Many of the participants said they were also participating in the MSP 3 grant activities. All of the teachers were very favorable to the quality of the professional development they have received and to the District 55 leadership that provides planning and coordination. The findings of the evaluators are as follow.

The two evaluators present did not conduct formal group interviews. Instead, both talked informally with individuals and small groups and accompanied them during their visit to the SC Aquarium and on the Harbor boat trip. Many to the participating teachers recognized them as project evaluators from previous site visits, but the evaluators introduced ourselves to others and explained their role in the project. Everyone was very forthcoming.

The participants were interviewed by evaluation staff to document how the Institute was planned and implemented. Following are comments made by teachers.

1. The grant continues to go well. Many of the teachers have participated in both MSP 2 and MSP 3 PD activities, so participation overlaps
2. A small group of teachers from District 56 were unanimous in praising the MSP 2 professional development overall and wondered why more teachers from that district did not have wider participation.
3. Another teacher thought it was a great opportunity to grow as a professional.
4. "I like the hands-on learning. As we learn about a topic, we get to do the activities ourselves, which makes it easier to give direction to the students later on."
5. "Earlier in the week we had Project Wet, and got to do many activities that are great for elementary students. We did not just have a demonstration."
6. "Earlier in the week we got to learn about Tinker Cad and 3-D printing."
7. "Some school districts, like the one where I live (not in Laurens County) have no professional development at all. This is a great opportunity."
8. "I have participated in professional development now for three different MSP grants."
9. "I have heard that not all MSP project do as well as ours. This MSP project has been successful because of good leadership."
10. "The Aquarium (field trip) would be great for our students at all grade levels. I like the hands-on aspects and chances to touch the sea critters."
11. "My personal favorite part of the aquarium was the albino alligator. Think my students would like it also."
12. "One thing I like is the chance to apply what I have learned right away. We did a water purification activity in PD and I got to do that the following week with students at the District summer camp program. Also did activities with probes and other instruments and used those at the camp also."
13. One teacher had not participated in prior MPS PD until the current Summer Academy. He teaches Montessori and thought the MSP project's emphasis on hands-on learning would translate very well to that environment.

Graduate Courses

To increase teacher content knowledge and to address the need of teachers with advanced degrees, one level of training included graduate credit courses. The providers for graduate courses were Presbyterian College, the Western Piedmont Education Consortium (WPEC) and Clemson University. The coursework began in the summer of 2014. On completion of all coursework, the cohort members will receive a master's degree in teaching math or science.

There were five graduate courses involving 60 teachers for a total of 4,620 contact hours (an average of 77 hours per participant) in 2015-2016. Details of the courses may be found in Appendix Two.

Mini Courses

Mini-courses were from one to eight contact hours and sessions were on topics identified by teachers and district instructional coaches to address specific goals and objectives of this program for specific groups of teachers. Topics for these courses included information on applying technology to the classroom, research based programs and strategies, as well as direct instruction on STEM content. There were eight mini courses during the grant year. Details of the courses may be found in Appendix Two.

School and District Based Training

School based training was accomplished during regular staff development times. All math and science teachers participated in these sessions during release time and other identified times. Many of these sessions focused on vertical teams and standards based instruction. Teachers received recertification points for these trainings. Details of the trainings may be found in Appendix Two.

Lead Teacher and Instructional Coaching Conferences and Training

The final level of professional development was for lead teachers, instructional coaches and program leaders. This level of training is designed to increase the capacity of the districts to continue project activities after the grant period. The training activities included at this level are conferences and specialized sessions designed to train trainers. These trainings were supported by a number of partners, prominent among which were the Western Piedmont Education Consortium and the S^2TEM Center SC. There were six conferences and 13 specialized trainings. Details of the conferences and trainings may be found in Appendix 2.

Summary of Summer Institute, Mini Courses, School and District Based Training and Lead Teacher and Instructional Coaching Conferences and Training

A total of 73 teachers and staff who participated in the Summer Institute received a total of 8,100 hours of experience over a two week period (an average of 110 hours per participant). There were 25 mini courses, school based professional developments and lead teacher and instructional coaching trainings involving 204 teachers and staff for a total of 2,576 contact hours (an average of 12.63 hours per participant). There were six conferences involving 15 teachers and staff for a total of 228 contact hours, an average of 15.2 hours per participant. There were 295 unique individual teachers who attended one or more of the professional development opportunities.

Lead Teacher and Instructional Coaching Activities

In addition to providing leadership during the 2016 Summer Institute and providing training based on school level needs during the academic year, the lead teachers and instructional coaches provided individualized support services to all teachers. These services included assistance with data collection, analysis and applications to instructional decision making at the classroom level. Lead teachers worked within schools to insure fidelity to best practice in all subject areas with a focus on implementing the engineering processes throughout the day in multiple contexts. Additionally, the project leadership team used principles of continuous improvement while monitoring instruction. This approach to helping teachers understand connections between instructional process and student learning fostered a collaborative approach among building level educators to change instructional practice as one way to improve student achievement and to close achievement gaps.

Instructional coaches/lead teachers received exemplary preparation for this work during the first year of the grant, attending 40 workshops, roundtables, discussion groups and seminars. These preparatory experiences were supported by several partners, including the SC Department of Education, the Adair Center, S^2TEM Center SC, Western Piedmont Education Consortium the Upper Savannah Education Center and Lexington School District 5.

During the second and third year of the grant, this type of preparation was continued and enhanced with support from partners such as the Western Piedmont Education Consortium, the Adair Center, S^2TEM Center SC, and Presbyterian College.

FINDINGS PART II: OUTCOME EVALUATION

Objective 1: Increase and improve STEM related professional development targeted toward increasing teacher content knowledge and instructional skills.

PERFORMANCE MEASURE

By June 2014, Increase the number of days of professional development for L55 to 17 days and increase L56 to 10 days.

In 2013-2014, District 55 professional development days increased to 17.6 compared to 13.4 the previous year, an increase of 31%. District 56 professional development days declined from 11.6 to 7.4, a decrease of 33%. For 2015-2016, a total of 73 teachers and staff who participated in the Summer Institute received a total of 8,100 hours of experience over a two week period (an average of 110 hours per person There were 25 mini courses, school based professional developments and lead teacher and instructional coaching trainings involving 204 teachers and staff for a total of 2,576 contact hours (an average of 12.63 hours per participant). There were six conferences involving 15 teachers and staff for a total of 228 contact hours, an average of 15,2 hours per participant. There were 295 unique individual teachers who attended one or more of the professional development opportunities for an average of 52.6 hours per individual. .

The project was successful in meeting this measure for District 55 but not for District 56 in 2013-2014 and met the measure for 2015-2016.

PERFORMANCE MEASURE

By September 2016, Increase the number of teachers with advanced degrees by 3 points (L55 = 63.8%, L56 = 61.2%)

In 2012-2013, 56.8% of the 336 teachers (all subjects) in Laurens 55 and 59% of the 178 teachers (all subjects) in Laurens 56 had an advanced degree. In 2013-2014, 56.7% of the 356 teachers (all subjects) in Laurens 55 and 54.5% of the 178 teachers (all subjects) in Laurens 56 had an advanced degree. In 2014-2015 23 teachers from Laurens 55 and 16 teachers from Laurens 56 participated in graduate coursework provided through the project. In 2015-2016, 56.5% of the teachers (all subjects) in Laurens 55 and 54.6% of the teachers (all subjects) in Laurens 56 had an advanced degree. In 2015-2016, 60 teachers from Laurens 55 and Laurens 56 participated in graduate coursework provided through the grant. While the number of teachers with advanced degrees in the two districts r remained about the same between 2012-2013 and 2015-2016, at least 60 teachers are working on their degrees under the auspices of the project.

Therefore, the project is making progress toward achieving this measure.

PERFORMANCE MEASURE

By June 2016, 90% of participating teachers will use at least two STEM instructional strategies during documented observations. (90% of 350 teachers = 315 teachers)

Use of STEM instructional strategies was measured using a four question survey of instructional coaches and administrators who observed classroom teachers. Since the 2013-2014 grant year was the baseline year of this grant, instructional coaches and administrators completed only the pre-survey. A post survey was conducted during the 2014-2015 grant year for comparison and then became the pre-test for the 2015-2016 grant year. A post survey was again conducted at the end of the 2015-2016 grant year for comparison. For each item, the observer was instructed to rate the teacher on a scale of 1 to 5, where 1 equals not at all and 5 equals all the time. In the first year of the grant, teachers are considered to be using the STEM instructional strategies if they are observed to have used them "sometimes" or more.

For teachers in Laurens 55, 2013-2014 observation data shows that students were on task and involved "often" (*mean=3.95, sd=0.75*). Of the 188 teachers observed, 184 (97.9%) exhibited use of this strategy "sometimes" or more. Teachers fostered deep conceptual understanding less than "often" and more than "sometimes" (*mean=3.61, sd=0.86*), and 172 (91.5%) exhibited use of this strategy "sometimes" or more. Content was presented accurately and fluidly more than "often" (*mean=4.13, sd=0.82*), and 185 (98.4%) exhibited use of this strategy "sometimes" or more. Connections were made to the "real world" slightly less than "often" (*mean=3.97, sd=0.81*), and 183 (97.3%) exhibited use of this strategy "sometimes" or more. Overall, 184 (97.9%) of the Laurens 55 teachers exhibited the use of two or more STEM instructional strategies in the first year of the grant.

In 2014-2015, observation data shows that students were on task and involved somewhat less than "often" (*mean=3.73, sd=0.72*). Of the 199 teachers observed, 195 (98%) exhibited use of this strategy "sometimes" or more. Teachers fostered deep conceptual understanding less than "often" and more than "sometimes" (*mean=3.61, sd=0.82*), and 183 (92%) exhibited use of this strategy "sometimes" or more. Content was presented accurately and fluidly somewhat less than "often" (*mean=3.74, sd=0.77*), and 191 (96%) exhibited use of this strategy "sometimes" or more. Connections were made to the "real world" slightly less than "often" (*mean=3.69, sd=0.71*), and 190 (95.5%) exhibited use of this strategy "sometimes" or more. Overall, 193 (97%) of the Laurens 55 teachers exhibited the use of two or more STEM instructional strategies sometimes or more in the second year of the grant. A comparison of scores for 95 teachers observed in both years shows that in 2013-2014 teachers used an average of 3.79 strategies sometimes or more (*sd=0.67*), and that there was no change in 2014-2015 in the average number of strategies used sometimes or more (*mean difference=0.00, sd=0.79*).

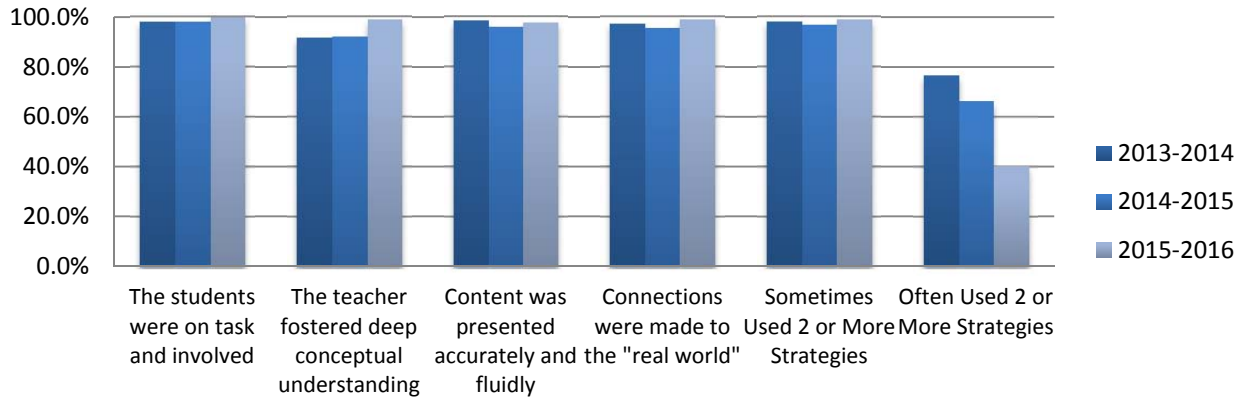
In 2015-2016, observation data shows that students were on task and involved less than "often" (*mean=3.28, sd=0.47*). Of the 87 teachers observed, 86 (98.9%) exhibited use of this strategy "sometimes" or more. Teachers fostered deep conceptual understanding less than "sometimes" (*mean=2.79, sd=0.67*), and 56 (64.4%) exhibited use of this strategy "sometimes" or more. Content was presented accurately and fluidly somewhat less than "often" (*mean=3.56, sd=0.64*), and 85 (97.7%) exhibited use of this strategy "sometimes" or more. Connections were made to the "real world" slightly less than "often" (*mean=3.47, sd=0.59*), and 84 (96.6%) exhibited use of this strategy "sometimes" or more. Overall, 86 (98.9%) of the Laurens 55 teachers exhibited the use of two or more STEM instructional strategies sometimes or more in the second year of the grant. It should be noted

that Laurens 55 experienced a significant re-assignment of administrators and lead teachers to other schools between the 2014-2015 and 2015-2016 academic years, The administrators and lead teachers conduct the observations. In order to avoid problems with inter rater reliability, it was decided by the district and the evaluators to have observations made only on teachers by the personnel who had done so previously, thus reducing the number of observations when compared to previous years. Despite the reduced number of observations, there was no significant difference between the percentages of teachers using two or more strategies in 2015 versus 2016 *(Z=0.9394, p=0.34722).*

Table 4: Use of STEM Instructional Strategies by Laurens 55 Teachers

	2013-2014			2014-2015			2015-2016		
	Mean	# Use	% Use	Mean	# Use	% Use	Mean	# Use	%Use
The students were on task and involved	3.95	184	97.9%	3.73	195	98.0%	3.28	87	100%
The teacher fostered deep conceptual understanding	3.61	172	91.5%	3.61	183	92.0%	2.79	86	98.9%
Content was presented accurately and fluidly	4.13	185	98.4%	3.74	191	96.0%	3.56	85	97.7%
Connections were made to the "real world"	3.97	183	97.3%	3.69	190	95.5%	3.47	86	98.9%
Sometimes Used 2 or More Strategies	-	*184*	*97.9%*	-	*193*	*97.0%*	-	*86*	*98.9%*
Often Used 2 or More Strategies	-	*144*	*76.6%*	-	*132*	*66.3%*	-	*35*	*40.2%*

Figure 4: Use of STEM Instructional Strategies by Laurens 55 Teachers



For teachers in Laurens 56, 2013-2014 observation data shows that students were on task and involved between "sometimes" and "often" (*mean=3.49, sd=0.87*). Of the 95 teachers observed, 82 (86.3%) exhibited use of this strategy "sometimes" or more. Teachers fostered deep conceptual understanding slightly more than "often" (*mean=3.31, sd=0.85*), and 81 (85.3%) exhibited use of this strategy "sometimes" or more. Content was presented accurately and fluidly more than "sometimes" (*mean=3.45, sd=0.74*), and 87 (91.6%) exhibited use of this strategy "sometimes" or more. Connections were made to the "real world" between "sometimes" and "often" (*mean=3.52, sd=0.82*), and 87 (91.6%) exhibited use of this strategy "sometimes" or more. Overall, 89 (93.7%) of the Laurens 56 teachers exhibited the use of two or more STEM instructional strategies in the first year of the grant. Laurens 56 did not provide observation data for the 2014-2015 or 2015-2016 grant year.

Table 5: Use of STEM Instructional Strategies by Laurens 56 Teachers

	2013-2014			2014-2015			2015-2016		
	Mean	**# Use**	**% Use**	**Mean**	**# Use**	**% Use**	**Mean**	**# Use**	**%Use**
The students were on task and involved	3.49	82	86.3%	-	-	-	-	-	-
The teacher fostered deep conceptual understanding	3.31	81	85.3%	-	-	-	-	-	-
Content was presented accurately and fluidly	3.45	87	91.6%	-	-	-	-	-	-
Connections were made to the "real world"	3.52	87	91.6%	-	-	-	-	-	-
Sometimes Used 2 or More Strategies	-	*89*	*93.7%*	-	-	-	-	-	-
Often Used 2 or More Strategies	-	*48*	*50.5%*	-	-	-	-	-	-

Of the 199 teachers who were observed in Laurens 55 during the 2014-2015 grant year, 193 (97%) exhibited the use of two or more STEM instructional strategies at least sometimes. Of the 87 teachers who were observed in Laurens 55 during the 2015-2016 grant year, 86 (98.9%) exhibited the use of two or more STEM instructional strategies at least sometimes.

The project met this measure.

PERFORMANCE MEASURE

By June 2016, 90% of participating teachers will demonstrate increased STEM content knowledge as demonstrated by pre and post scores on a valid and reliable instrument

The pre and post STEM content knowledge tests were developed by staff working on the College of Charleston MSP grant and were used for the Laurens grant with permission. Copies of the assessments are included in Appendix One.

During the 2013-2014 grant year, 44 teachers from Laurens 55 and 56 completed the math assessment. The 15 teachers who participated in the Summer Institute and/or graduate coursework scored an average of 71.67 (sd=28.77) on the assessment. The 12 teachers who participated in mini-courses, coaching, conferences, or other professional development offered by the district scored an average of 76.84 (sd=21.63) on the assessment. The 17 teachers who did not participate in any of the professional development offerings scored an average of 82.55 (sd=19.65) on the assessment. The differences between the groups are not statistically different from zero (*F=0.847, df=2, p=0.436*).

During the 2014-2015 grant year, 37 teachers from Laurens 55 and 56 completed the math assessment. The 13 teachers who participated in the Summer Institute and/or graduate coursework scored an average of 82.94 (sd=11.44) on the assessment. The eight teachers who participated in mini-courses, conferences, or other professional development offered by the district scored an average of 68.36 (sd=32.37) on the assessment. The 16 teachers who did not participate in any of

the professional development offerings scored an average of 69.15 (sd=26.31) on the assessment. The differences between the groups are not statistically different from zero (*F=1.47, df=2, p=0.244*).

Matched scores from both years were available for four Summer Institute and/or graduate course participants (intensive participation), three district professional development participants (light participation), and two comparison group members (no participation). The four teachers with intensive participation increased their content knowledge as measured by the math assessment by an average of 3.9 points (*sd=5.32*). The three teachers with light participation increased their content knowledge by an average of 5.2 points (*sd=7.9*), and the two teachers with no participation saw a decrease in content knowledge measured by the assessment of 6.2 points (*sd=22.06*). There are no significant differences between the groups, likely due to the small sample size and large variation in scores (*F=0.77, df=2, p=0.503*). Efforts will continue to be made to ensure that sufficient data on content knowledge is collected during the third year of the grant.

During the 2015-2016 grant year, 31 teachers from Laurens 55 completed the math assessment. The 20 teachers who participated in the Summer Institute and/or graduate coursework scored an average of 74.7 (sd=21.54) on the assessment. The 11 teachers who participated in mini-courses, conferences, or other professional development offered by the district scored an average of 80.40 (sd=16.22) on the assessment. The differences between the groups are not statistically different (*F=0.584, df=1, p=0.451*). Matched scores from both years were available for two Summer Institute and/or graduate course participants (intensive participation) and one district professional development participant (light participation), The two teachers with intensive participation decreased their content knowledge as measured by the math assessment by an average of 3.15 points (*sd=8.84*). The one participant with no participation saw an increase in content knowledge as measured by the assessment of 20 points. There is no significant difference between the groups, likely due to the small sample size and large variation in scores (*F=21.291, df=1, p=0.136*).

The project is progressing toward meeting this measure.

Table 6: Participating Teachers' Math Content Knowledge

Group	2013-2014			2014-2015			2015-2016		
	Mean	N	SD	Mean	N	SD	Mean	N	SD
Summer Institute and/or Graduate Courses	71.67	15	28.77	82.94	13	11.44	74.7	20	21.54
District Professional Development and/or Coaching	76.84	12	21.63	68.36	8	32.37	80.40	11	16.22
Comparison (no participation)	82.55	17	19.65	69.15	16	26.31	-	-	-
Total	**77.28**	**44**	**23.55**	**73.82**	**37**	**24.13**	**76.72**	**31**	**19.73**

During the 2013-2014 grant year, 39 teachers from Laurens 55 and 56 completed the science assessment. The 13 teachers who participated in the Summer Institute and/or graduate coursework scored an average of 53.35 (sd=21.58) on the assessment. The 11 teachers who participated in mini-courses, coaching, conferences, or other professional development offered by the district scored an average of 55.71 (sd=18.48) on the assessment. The 15 teachers who did not participate in any of the professional development offerings scored an average of 60.21 (sd=21.57) on the assessment.

The differences between the groups are not statistically different from zero (*F=0.397, df=2, p=0.675*).

During the 2014-2015 grant year, 34 teachers from Laurens 55 and 56 completed the science assessment. The 15 teachers who participated in the Summer Institute and/or graduate coursework scored an average of 54.77 (sd=17.23) on the assessment. The 19 teachers who did not participate in any of the professional development offerings scored an average of 56.72 (sd=18.51) on the assessment. The differences between the groups are not statistically different from zero (*F=0.099, df=2, p=0.755*).

Matched scores from 2013-2014 and 2014-2015 were available for one Summer Institute and/or graduate course participants (intensive participation) and seven comparison group members (no participation). The one teacher with intensive participation had no change in content knowledge as measured by the science assessment. The seven teachers with no participation saw a decrease in content knowledge measured by the assessment of 1.46 points (*sd=10.04*). Efforts will continue to be made to ensure that sufficient data on content knowledge is collected during the third year of the grant.

During the 2015-2016 grant year, 46 teachers from Laurens 55 and 56 completed the science assessment. The 27 teachers who participated in the Summer Institute and/or graduate coursework scored an average of 52.58 (sd=15.38) on the assessment. The 19 teachers who did not participate in any of the professional development offerings scored an average of 57.49 (sd=13.27) on the assessment. The differences between the groups are not statistically significant (*F=1.270, df=2, p=2.66*).

The project is progressing toward this measure.

Table 7: Participating Teachers' Science Content Knowledge

Group	2013-2014			2014-2015			2015-2016		
	Mean	N	SD	Mean	N	SD	Mean	N	SD
Summer Institute and/or Graduate Courses	53.35	13	21.58	54.77	15	17.23	52.58	27	15.38
District Professional Development and/or Coaching	55.71	11	18.48	-	-	-	57.49	19	13.27
Comparison (no participation)	60.21	15	21.57	56.72	19	18.51	-	-	-
Total	**56.66**	**39**	**20.43**	**55.86**	**34**	**17.71**	**54.61**	**46**	**14.60**

Objective 2: Improve student achievement on standardized tests

PERFORMANCE MEASURE

In each year of the program, the percentage of students in each district who score met or above on the math and science state assessments and who pass the math and biology EOC will improve by 2 points. (Note: Since the state math assessment instrument was changed during each year of the grant, evaluating changes in math scores for students is not possible.)

In 2014, the proportion of students in Laurens 55 who scored met or above on the math PASS decreased by 1.4 points. The difference between the percentage in 2013 (69.6%) and in 2014 (68.2%) is not statistically significant (*z=1.04, p=0.463*). The proportion of students in Laurens 56 who scored met or above on the math PASS decreased by 2.6 points. The difference between the percentage in 2013 (73.9%) and in 2014 (71.2%) is not statistically significant (*z=1.52, p=0.251*).

In 2015, the state changed the math assessment to the ACT Aspire. Of the 2,580 Laurens 55 students in grades 3 through 8 that were tested, 41.3% met the readiness benchmark. Of the 1,334 Laurens 56 students in grades 3 through 8 that were tested, 42.4% met the readiness benchmark.

Between 2013 and 2014, the proportion of students in Laurens 55 who scored met or above on the science PASS decreased by 3.5 points. The difference between the percentage in 2013 (70.6%) and in 2014 (67.1%) is not statistically significant (*z=2.19, p=0.072*). In 2015, the percentage dropped again to 64.8%, but the difference is not statistically different from zero (*z=1.45, p=0.278*). The proportion of students in Laurens 56 who scored met or above on the science PASS decreased by 4.0 points from 2013 to 2014. The difference between the percentage in 2013 (70.9%) and in 2014 (66.9%) is not statistically significant (*z=1.84, p=0.148*). In 2015, the percentage of Laurens 56 students scoring met or above on the science PASS also dropped to 62.9%, but the difference is not statistically significant (*z=1.85, p=0.143*).

In 2016, the state changed the math assessment to the SC READY math assessment. Of the 2,599 Laurens 55 students in grades 3 through 8 that were tested, 34.13% met or exceeded the readiness benchmark. Of the 1,336 Laurens 56 students in grades 3 through 8 that were tested, 33.68% met or exceeded the readiness benchmark. Due to the difference in tests administered between 2015 and 2016, a comparison could not be made between student test scores. Of the 2,134 Laurens 55 students in grades 4 through 8 that completed the science PASS, 1,289 (60.40%) score met or exemplary. Of the 1,105 Laurens 56 students in grades 4 through 8 that completed the science PASS, 658 (59.55%) score met or exemplary. The difference between the percentage in 2015 (62.9%) and 2016 (62.25%) is not statistically significant.

From 2013 to 2014, the proportion of students in Laurens 55 who passed the Algebra End of Course (EOC) test decreased by 1.1 points. The difference between the percentage in 2013 (87.2%) and in 2014 (86.1%) is not statistically significant (*z=0.52, p=0.698*). In 2015, the percentage of students in Laurens 55 who passed the Algebra EOC decreased by 10.5 points, and this difference is statistically significant (*z=4.27, p<0.001*). The number of students who took the Algebra EOC in Laurens 55 also decreased by almost 100; therefore, the district should examine this further to identify potential causes for the anomaly. The proportion of students in Laurens 56 who scored met or above on the Algebra EOC increased by 5.8 points from 2013 to 2014. The difference between the percentage in 2013 (71.6%) and in 2014 (77.4%) is not statistically significant (*z=1.47, p=0.272*).

In 2015-2016, 500 students in Laurens 55 completed the Algebra End of Course (EOC) test, and 81% earned a 70 or higher. From 2015 to 2016, the proportion of students in Laurens 55 who passed the Algebra EOC test increased by 5.4 percent. The difference between the percentage of students passing the Algebra EOC in 2015 (75.6%) and in 2016 (81%) is not statistically significant (*z=-2.04, p=0.0414*).

In Laurens 56, 227 students completed the Algebra EOC test in 2016, and 68.3% earned a 70 or higher. From 2015 (87.2%) to 2016 (68.3%), the proportion of students in Laurens 56 who passed the Algebra EOC test decreased by 18.9 percent, and this difference is statistically significant (*z=4.6001, p<0.001).*

From 2013 to 2014, the proportion of students in Laurens 55 who passed the Biology EOC decreased by 6.0 points. The difference between the percentage in 2013 (79.1%) and in 2014 (73.1%) is not statistically significant (*z=2.11, p=0.086*). In 2015, the percentage of students in Laurens 55 who passed the Biology EOC decreased by 1.3 points, and this difference is not statistically significant (*z=0.44, p=0.724*). In 2016, the percentage of students in Laurens 55 who passed the Biology EOC (65.7%) decreased by 6.1, which is not statistically significant *(z=1.855, p= 0.063).*

The proportion of students in Laurens 56 who scored met or above on the Biology EOC decreased by 3.1 points from 2013 to 2014. The difference between the percentage in 2013 (74.9%) and in 2014 (71.8%) is not statistically significant (*z=0.705, p=0.622*). In 2015, 87.3% of students earned a 70 or higher, and in 2016 81.8% earned a 70 or higher on the Biology EOC. The 5.5 percentage difference is not statistically significant (*z=1.5496, p=0.1211).*
Changes to the state assessment in math prevented an analysis of change in meeting the standard in math. On most of the results of those tests that were available, the differences in the proportion of students meeting the state standard on each test has not changed significantly from 2014 to 2016.

In one state assessment case each for 2014-2015 and 2015-2016 the percentage of students meeting the standard declined significantly. In all other cases there were no significant changes, although the trend for scores was negative. Therefore, the project has not met this objective.

Table 8: Comparison of Achievement on State Tests from 2013 to 2016

	Laurens 55					Laurens 56				
	2013	2014	2015	2016	Change	2013	2014	2015	2016	Change
Math PASS	69.6%	68.2%	-	-	-	73.9%	71.2%	-	-	-
Math ACT	-	-	41.3%	-	-	-	-	42.4%	-	-
SC READY	-	-	-	34.1%	-	-	-	-	33.7%	-
Science PASS	70.6%	67.1%	64.8%	60.4%	(4.4)	70.9%	66.9%	62.9%	59.6%	(3.3)
Algebra EOC	87.2%	86.1%	75.6%	81%	5.4	71.6%	77.4%	87.2%	68.3%	(18.9)
Biology EOC	79.1%	73.1%	71.8%	65.7%	(6.1)	74.9%	71.8%	87.3%	81.8%	(5.5)

* Test of significance is based on the Normal approximation to the binomial distribution and is calculated using the z value.

Objective 3: Narrow GAP of sub groups

PERFORMANCE MEASURE

Each year of the program, each district will narrow the achievement gap between the state Annual Measurement Objective (AMO) and the average scale score for special needs students by 5 points.

The Annual Measurement Objective (AMO) is established by the South Carolina Department of Education under the Elementary and Secondary Education Act (ESEA) accountability system. The AMO is the target average score for all students in the district, divided by grade level, and increases at a steady rate each year. The districts' progress toward narrowing the achievement gap of students with special needs is measured by determining the distance of the average scores for students with special needs from the AMO in each year, and then calculating the difference. As of the date of this report, the state has not published the AMO's for 2015. For 2015, scores for each district are compared to the state average. End of Course data files for the state had not been published as of the date of this report; therefore, comparisons for high school students are not available for this report.

In Laurens 55 in 2013, the achievement gap between the AMO and the average scale score on the math PASS for students with special needs in elementary school was 47.7 points. In 2014, students with special needs in elementary school scored an average of 597.6 on the math PASS, which is 42.4 points less than the AMO. Therefore, the achievement gap in math for elementary school students with special needs in Laurens 55 was reduced by 5.2 points. In 2015, students with special needs in elementary school scored an average of 413.0 on the math ACT Aspire, compared to a state average of 412.6. Therefore, the average score for elementary students with a special need in Laurens 55 was 0.4 points higher than the state average. The gap in science for elementary school students with special needs increased slightly by 0.7 points from 49.6 points in 2013 to 50.3 points in 2014. In 2015, the average score on the science PASS for elementary students with a special need in Laurens 55 was 7.6 points higher than the state average.

In Laurens 55 in 2013, the achievement gap between the AMO and the average scale score on the math PASS for students with special needs in middle school was 41.8 points. In 2014, students with special needs in middle school scored an average of 583.5 on the math PASS, which is 48.5 points less than the AMO. Therefore, the achievement gap in math for middle school students with special needs in Laurens 55 increased by 6.7 points. In 2015, the average score on the math ACT Aspire for middle school students with a special need in Laurens 55 was 0.9 points higher than the state average. The gap in science for middle school students with special needs increased by 2.8 points from 45.3 points in 2013 to 48 points in 2014. In 2015, the average score on the science PASS for middle school students with a special need in Laurens 55 was 10.2 points higher than the state average.

In Laurens 55 in 2013, the achievement gap between the AMO and the average score on the math HSAP for students with special needs in high school was 34.3 points. In 2014, students with special needs in high school scored an average of 194 on the math HSAP, which is 32 points less than the AMO. Therefore, the achievement gap in math for high school students with special needs

in Laurens 55 decreased by 2.3 points. The gap in science for high school students with special needs increased slightly by 0.5 points from 10.8 points in 2013 to 11.3 points in 2014.

In Laurens 56 in 2013, the achievement gap between the AMO and the average scale score on the math PASS for students with special needs in elementary school was 32.1 points. In 2014, students with special needs in elementary school scored an average of 595.8 on the math PASS, which is 44.2 points less than the AMO. Therefore, the achievement gap in math for elementary school students with special needs in Laurens 56 increased by 12.1 points. In 2015, the average score on the math ACT Aspire for elementary school students with a special need in Laurens 56 was 0.4 points higher than the state average. The gap in science for elementary school students with special needs increased by 12.1 points from 32.1 points in 2013 to 44.2 points in 2014. In 2015, the average score on the science PASS for elementary school students with a special need in Laurens 56 was 2.3 points lower than the state average.

In Laurens 56 in 2013, the achievement gap between the AMO and the average scale score on the math PASS for students with special needs in middle school was 48.4 points. In 2014, students with special needs in middle school scored an average of 582.5 on the math PASS, which is 49.5 points less than the AMO. Therefore, the achievement gap in math for middle school students with special needs in Laurens 56 increased by 1.1 points. In 2015, the average score on the math ACT Aspire for middle school students with a special need in Laurens 56 was 0.8 points higher than the state average. The gap in science for middle school students with special needs increased slightly by 0.4 points from 50.4 points in 2013 to 50.8 points in 2014. In 2015, the average score on the science PASS for middle school students with a special need in Laurens 56 was 1.6 points higher than the state average.

In Laurens 56 in 2013, the achievement gap between the AMO and the average score on the math HSAP for students with special needs in high school was 34.4 points. In 2014, students with special needs in high school scored an average of 191 on the math HSAP, which is 35 points less than the AMO. Therefore, the achievement gap in math for high school students with special needs in Laurens 56 increased by 0.6 points. The gap in science for high school students with special needs decreased by 4.2 points from 14.6 points in 2013 to 10.4 points in 2014.

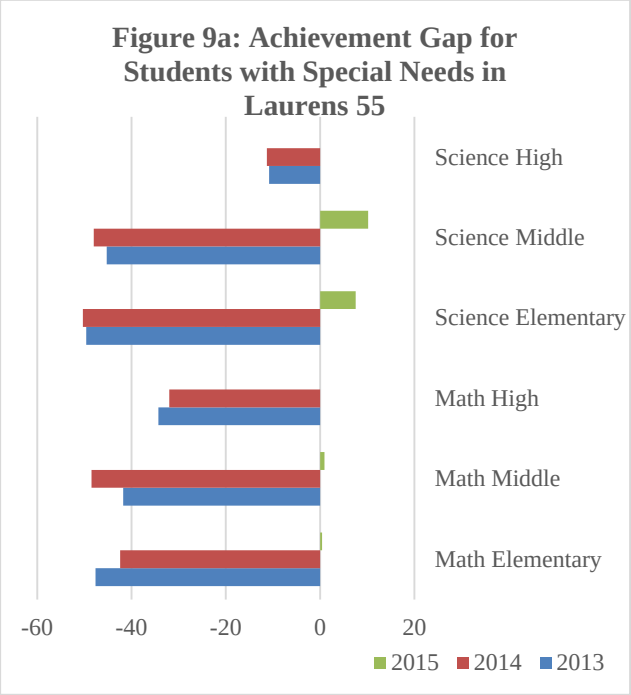
In 2015, the achievement gap in math appears to have been eliminated for both Laurens 55 and Laurens 56 students with special needs in elementary school and middle school, although changes to the state assessment may have influenced the change. Conclusions based on this data should be made with caution. The achievement gap in science was reduced for Laurens 55 students with special needs in elementary and middle school and for Laurens 56 students with a special need in middle school. The achievement gap was reduced for Laurens 56 students with a special need in elementary school. This data should be viewed with caution, considering the drastic changes in scores from previous years, and the fact that the comparison is made to the state average instead of the annual measurement objective. The data for this analysis will be updated once the AMO has been published and data for high school students is available.

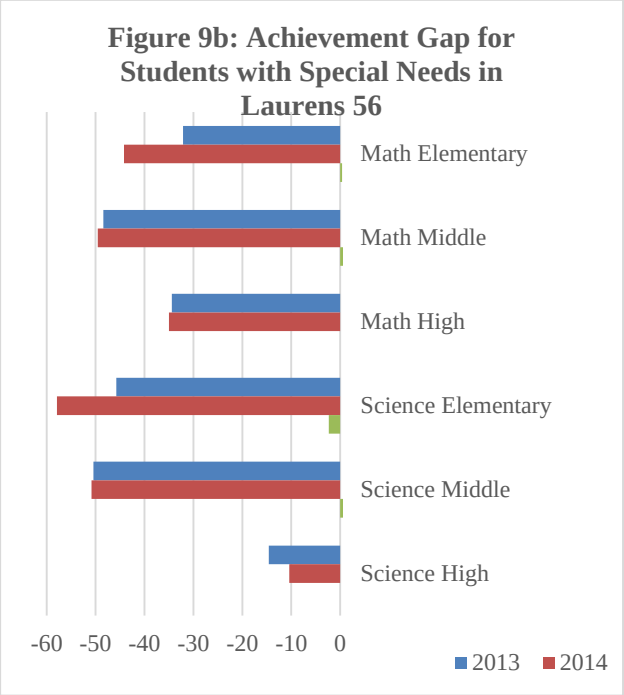
At the time this report was being written, the data necessary to examine the 2015-2016 progress on this objective was not available.

Based on the data available, the project has met this objective.

Table 9: Achievement Gap on State Tests for Students with Special Needs from 2013 to 2015

	Laurens 55				Laurens 56						
	2013	2014	2015	|2015*x*-*State*|	2013	2014	2015	|2015*x*-*State*|	2013 AMO	2014 AMO	2015 State Avg.
Mathematics											
Elementary	587.3	597.6	413.0	0.4	602.9	595.8	413.0	0.4	635	640	412.6
Middle	586.2	583.5	416.3	0.9	579.6	582.5	416.2	0.8	628	632	415.3
High	188.7	194.0	--	--	188.6	191.0	--	--	223	226	--
Science											
Elementary	585.4	590.5	589.7	7.6	589.2	582.1	580.6	(2.3)	635	640	583.0
Middle	582.7	586.6	584.0	10.2	577.6	581.2	578.0	1.6	628	632	576.4
High	66.2	--	66.7	--	62.4	67.6	--	--	77	78	--





FINDINGS PART III: IMPACT OF THE PROJECT ON STUDENT ACHIEVEMENT

Within Group Comparisons

2014-2015

Science PASS data for 2015 was available for 2,112 students in Laurens 55. Of these, 204 did not have teacher data associated with the record. Of those remaining, 720 students did not have 2014 test scores, but 289 of these had 2013 test scores. Therefore, 2013 test scores were used in place of the 2014 test scores as a measure of student achievement. The average of 2014 test scores, without the inclusion of these scores is 624.91 (sd=46.22). After including the 2013 test scores, the average score for prior achievement is 624.995 (sd=46.20). The resultant sample of 1,477 student science PASS scores were associated with 44 teachers in Laurens 55.

Of the remaining 1,477 student records included in the sample, 12.7% were in the fourth grade, 20% were in the fifth grade, 24.1% were in the sixth grade, 18.6% were in the seventh grade, and 24.6% were in the eighth grade. Students were evenly split between male (50.5%) and female (49.5%), 16.1% were enrolled in a gifted education program, 11.2% had an Individualized Education Plan (IEP), 7.8% were considered to have limited English proficiency, and 70.8% received free or reduced price meals. Similar to the distribution of race and ethnicity of all students in the district, 60.2% of students with available data are White, 28.4% are African American, 8.7% are Hispanic, and 2.8% are of other races. The percentage of students of other races is slightly higher than the district total (0.7%). Most of the students in this category are of mixed descent (2.1% of students with test scores).

Teachers were divided into three groups according to their level of participation in project activities. For purposes of this analysis, activities were grouped according to the year in which the activities would have had impact. For instance, participation in activities during the summer of 2014 was grouped with activities that occurred during the school year of 2014-2015, since these activities would have impacted student achievement on tests administered in the spring of 2015. The impact of activities that occurred during the summer of 2015 are not included in this analysis.

Of the teachers who participated in 2015 activities, 11 participated in “intensive” project activities (summer institute and/or graduate courses), 15 participated in “light” project activities (district mini courses, coaching, and other district-provided professional development), and 19 participated in “none” of the project activities. Differences in teacher characteristics for these groups were examined. Data on teacher qualifications were available for eight of the teachers in the intensive group, four teachers in the light group, and six teachers in the no participation group. There were no significant differences found among these teachers on measures related to educational attainment, years of teaching science, and number of students in the classroom. Observation post-data from the end of the 2015 school year, which measures the extent to which targeted behaviors are exhibited by teachers in the classroom, were available for 10 teachers in the intensive group, 14 teachers in the light group, and 16 teachers in the no participation group. There were no significant differences between groups on individual observation items or the total score. The only difference

identified is that teachers who participated intensively in 2015 are significantly more likely to have also participated intensively in 2014 (X^2=9.96, df=4, p=0.041). Of the 10 teachers with intensive participation, six (60%) also participated intensively in 2014. This is a subgroup of teachers, and not the total attrition rate.

Differences in student characteristics between the groups were also tested. Of the 1,477 students for whom all data were available, students whose teacher participated in intensive project activities in 2015 were more likely to be in middle school (77.5%). Students whose teacher participated in light project activities were more likely to be in elementary school (76.4%), and students whose teacher participated in none of the activities were more likely to be in middle school (81.2%). The proportion of students who receive subsidized meals is significantly lower for teachers who participated in intensive activities (63.2% of students taught by teachers in intensive activities received subsidized meals compared to 72.4% of students taught by teachers in light activities and 74.4% of students taught by teachers in no activities) (X^2=16.5, df=2, p<0.001). The proportion of students who are White is significantly higher for teachers who participated in intensive activities (62.5% of students taught by teachers in intensive activities are White compared to 57.6% of students taught by teachers in light activities and 60.1% of students taught by teachers in no activities). The proportion of students who are of other ethnicities is significantly higher for teachers in light activities (5.5%) (X^2=17.36, df=6, p=0.008). There were no significant differences between the groups in students' gender, IEP status, LEP status, or gifted education status.

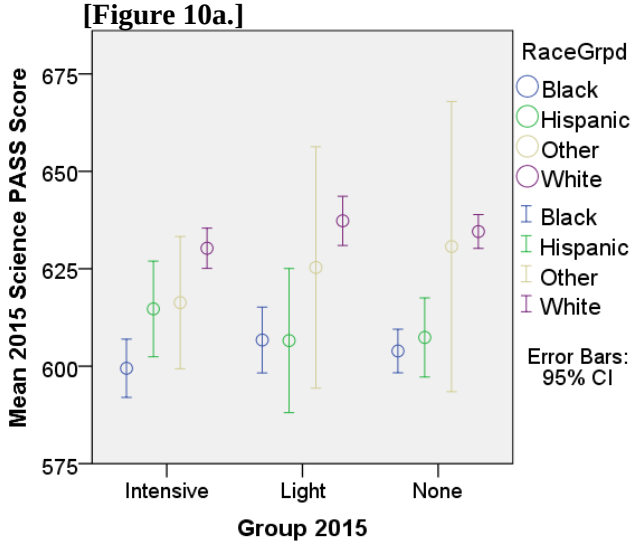
Of the 413 students for whom 2015 scores were available and whose teacher participated in intensive activities during 2015, 29.8% of students did not meet the standard in Science, 57.1% met the standard, and 13.1% scored exemplary. Of the 330 student whose teacher participated in light project activities, 27.3% did not meet the standard, 55.2% met the standard, and 17.6% scored exemplary. In comparison, of the 734 students whose teacher did not participate, 34.1% scored not met, 47% scored met, and 18.9% scored met. Therefore, students whose teacher participated in any project activities were more likely to score met, whereas students whose teacher did not participate were more likely to score either not met or exemplary (X^2=15.5, df=4, p=0.004). An analysis of average scale scores, however, indicates that students of teachers with intensive participation have a lower average score (mean=620.34, sd=42.68) than students of teachers with light (mean=625.33, sd=46.83) or no participation (mean=623.03, sd=46.9), but the differences are not statistically significant (*F=1.11, df=2, p=0.329*). An analysis of previous year test scores (2014 supplemented by 2013 when necessary) indicates that students of teachers with light participation had a significantly lower average score than students of teachers with either intensive or no participation (*F=4.57, df=2, p=0.011*).

Figures 10a through 10b below demonstrate the variability in test scores across both participation groups and selected demographic groups, where the circle represents the average for that group and the error bars represent the 95% confidence interval. Figure 10a represents the average 2015 science PASS score and standard error by participation level and race of the student. This figure indicates that overall, White students score higher on the test than any other demographic group, that the variability in scores for students of other races is quite large, and that African American students whose teachers participated intensively scored lower than any other group. Comparing those trends to the trends in prior achievement data (Figure 10b) indicates that achievement for African Americans dropped for teachers who participated in intensive activities, but increased for all other demographic groups. A comparison of grade level achievement by participation group

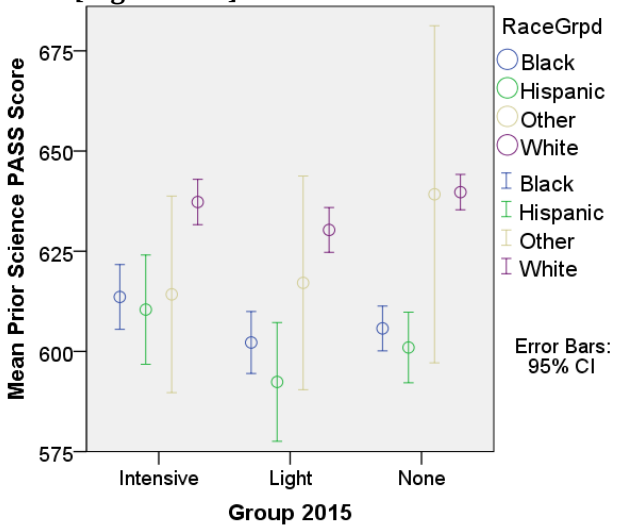
(Figure 10c) shows that students in elementary school have higher average scores if their teacher participated in intensive activities, whereas students in middle school have higher average scores of their teacher participated in light project activities. Across the board, students who receive subsidized meals have lower average achievement than students who do not (Figure 10d), but these students tend to fare better with a teacher who participated in light or no project activities rather than intensive activities.

Figures 10a – 10d: Average 2015 Science Score and Standard Error for Selected Groups

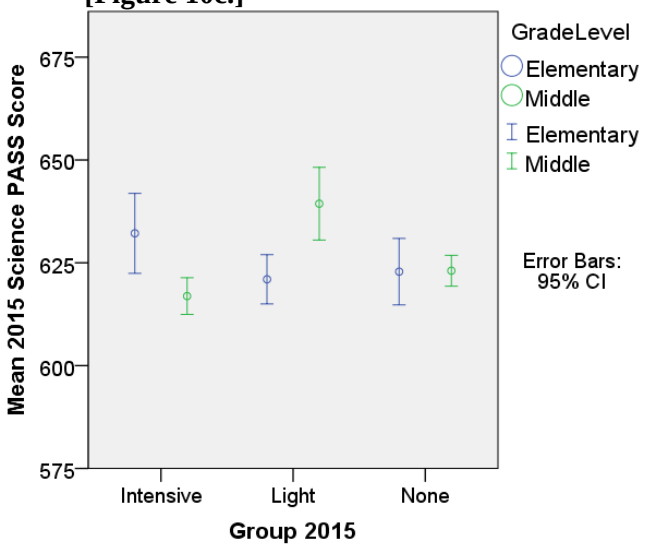
[Figure 10a.]



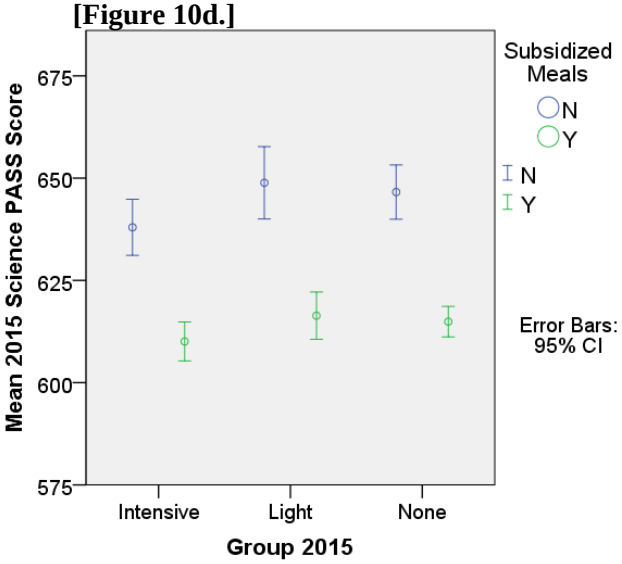
[Figure 10b.]



[Figure 10c.]



[Figure 10d.]



To estimate the combined impact of the student variables, teacher data, and teacher participation on student achievement on the 2015 Science PASS test, multiple linear regression estimation was used. The final model used in the analysis is:

$$TestScore_i = \beta_0 + \beta_1 Participation_i + \beta_2 StudentDemographics_i + \beta_3 TeacherEffects_i + u_i$$

To test the effects of each portion of the model, five separate models were developed, each one adding a new set of variables and comparing the effect on the adjusted R^2.

Initial analysis of the student control variables (Model 1) indicates that student effects account for approximately 55.2% of the variation in the 2015 Science PASS test scores ($F_{(10, 1466)}=182.8, p<0.001$). For every one point increase in prior test score achievement, the 2015 score is about 0.6 points higher ($t=28.74, p<0.001$). Being in middle school decreases the test score by -7.1 points ($t=-4.15, p<0.001$), having an IEP decreases the test score by 6.4 points ($t=-2.44, p=0.015$), being in a gifted program increases the test score by 19 points ($t=7.69, p<0.001$), receiving subsidized meals decreases the test score by 7.9 points ($t=-4.11, p<0.001$), and being African American decreases the test score by 7.5 points ($t=-3.78, p<0.001$). Gender, English proficiency, being Hispanic, and being of other races does not have a significant impact on the model.

A fixed effect model controlling for the teacher of the student was created to test the extent to which the individual teacher impacts test results. The fixed effect model has a within group R^2 of 0.535 and a between groups R^2 of 0.676 (overall R^2 = 0.549). This indicates that teacher effects represent approximately 14.1% of the variation in student achievement between classrooms. Models 2-5 examine particular teacher characteristics and participation to identify if any of the characteristics that are being measured can account for this teacher effect.

Returning to the student control variables and adding teacher participation in project activities increases the adjusted R^2 from .552 to .557. In Model 2, the influence of previous test scores (+0.6 points) is unchanged, as is the influence of having an IEP (-6.2 points), being in a gifted program (+19 points), receiving subsidized meals (-8.5 points), and being African American (-7.8 points). The effect of being in middle school decreased to an insignificant level ($\beta=-3.98, t=-1.92, p=0.055$). In this model, participation does not have a significant effect for intensive activities in 2015 ($t=-1.75, p=0.81$), light activities in 2015 ($t=1.8, p=0.72$), or intensive activities in 2014 ($t=-1.78, p=0.75$). Participation in light activities in 2014 is associated with a 4.93 point decrease in 2015 test scores ($t=-2.27, p=0.024$).

Adding observation data on teacher implementation of targeted behaviors increases the adjusted R^2 to .561. In Model 3, the influence of previous test scores (+0.6 points) is unchanged, as is the influence of having an IEP (-5.8 points), being in a gifted program (+19.3 points), receiving subsidized meals (-8.7 points), and being African American (-7.0 points). A one point increase in the frequency with which teachers are observed having students who are on task and involved results in a 10.1 point increase in student test scores ($t=3.18, p=0.002$), and a one point increase in the frequency with which teachers are observed presenting content accurately and fluidly results in a 11.3 point decrease in student test scores ($t=-2.7, p=0.007$). In this model, participation does not have a significant effect for intensive activities in 2015 ($t=-1.37, p=0.171$). Having participated in light activities in 2015 increases test scores by 5.4 points ($t=1.99, p=0.047$), but having participated in intensive activities in 2014 decreases test scores by 10.4 points ($t=-3.16, p=0.002$) and having participated in light activities in 2014 decreases test scores by 6.6 points ($t=-2.56, p=0.011$).

Adding teacher qualification data increases the adjusted R^2 to .600 (note that the availability of teacher qualifications data reduces the N in this model to only 737 students). In Model 4, the

influence of previous test scores (+0.6 points) is unchanged, as is the influence of being in a gifted program (+19.5 points), receiving subsidized meals (-11.1 points), and being African American (-7.6 points). The influence of having an IEP was reduced to an insignificant level (*t=-0.59, p=0.555*), the influence of having limited English proficiency increased to a 25.2 reduction in test scores (*t=-2.18, p=0.030*), and the influence of being Hispanic increased to a 24.1 increase in test scores (*t=2.124, p=0.034*). A one point increase in the frequency with which teachers are observed having students who are on task and involved results in a 46.6 point increase in student test scores (*t=6.37, p<0.001*), and a one point increase in the frequency with which teachers are observed The fostering deep conceptual understanding results in a 29.3 point decrease in student test scores (*t=-3.84, p<0.001*). Neither of the available teacher qualifications (having a Master's degree and teaching for three years or less) have a significant impact on test scores. In this model, participation does not have a significant effect for intensive activities in 2015 (*t=-0.64, p=0.523*). Having participated in light activities in 2015 increases test scores by 11.1 points (*t=1.99, p=0.047*), but having participated in intensive activities in 2014 decreases test scores by 27.6 points (*t=-3.16, p=0.002*). Having participated in light activities in 2014 does not have a significant impact on test scores (*t=-2.56, p=0.011*).

Of particular importance in differences between models 3 and 4 are the changes in influence of teacher observation data. A closer examination of this data reveals the possibility that these influences may be an artifact of the teacher variable, rather than an effect of what is being observed. The teacher data is repeated across each student that teacher has in the science classroom. Therefore, if a teacher has a low score on one of these variables and teaches 200 students, that score is weighted more heavily than the high score of a teacher who teaches 20 students. When we include teacher qualifications data, several teachers who did not respond to the survey are excluded from the model. Model 5 was created to determine whether teacher qualifications had any effect on student test scores if observation data was not included, and how that effect would influence the impact of the project activities.

Removing the observation data decreases the adjusted R^2 to .572 (note that the availability of teacher qualifications data reduces the N in this model to only 825 students). In Model 5, neither of the available teacher qualifications (having a Master's degree and teaching for three years or less) have a significant impact on test scores. Participation in intensive project activities in 2015, intensive project activities in 2014, and light project activities in 2014 have no effect. The effect of participating in light project activities in 2015 increases to a 16.6 point increase in test scores for teachers who participated (*t=3.95, p<0.001*).

Taken together with the differences in student demographics across groups, it appears that participation in intensive project activities does not have a significant influence because these teachers are more likely to teach students who are White, are not receiving free or reduced lunch, and are in middle school, and these students traditionally have higher test scores to begin with and see less change in their scores year over year. If we examine the interaction between race, subsidized meals, and participation in activities, we find that African American students whose teacher participates in intensive activities see an average decrease in scores of 14.1 points (n=112, sd=34.9), whereas African American students whose teacher participates in light activities see an average increase in scores of 4.5 points (n=96, sd=33.3) and African American students whose teacher participates in no activities sees an average decrease in scores of 1.8 points (n=211,

sd=30.9) (*F=4.04, df=3, p=0.007*) and this interaction accounts for 8% of the variation in test scores.

Table 11: Impact of Participation on Student Achievement

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
Adjusted R2	0.552	0.557	0.561	0.600	0.572
N	1,477	1,477	1,334	737	825
Student-Level Variables					
Previous Science Test Score	0.6*	0.6*	0.6*	0.6*	0.6*
Middle School	-7.1*	-4.0	-2.2	3.9	0.5
Female	-2.1	-2.0	-2.3	-0.5	1.0
Individualized Education Plan	-6.4*	-6.2*	-5.8*	-2.2	-4.1
Limited English Proficiency	2.1	1.8	3.1	-25.2*	-23.3
Gifted Education Program	19.0*	18.9*	19.3*	19.5*	18.9*
Subsidized Meals	-7.9*	-8.5*	-8.7*	-11.1*	-9.4*
Race – African American	-7.5*	-7.8*	-7.0*	-7.6*	-10.7*
Race – Hispanic	0.3	-0.5	-2.3	24.1*	22.2
Race – Other (Non-White)	0.5	-0.2	-1.4	-5.2	-6.2
Participation Variables					
2015 Intensive Participation		-3.8	-3.1	-2.2	1.5
2015 Light Participation		4.3	5.4*	11.1*	16.6*
2014 Intensive Participation		-4.6	-10.4*	-27.6*	4.8
2014 Light Participation		-4.9*	-6.6*	-12.6	4.6
Observation Data					
The students were on task and involved			10.1*	46.6*	
The teacher fostered deep conceptual understanding			1.0	-29.3*	
Content was presented accurately and fluidly			-11.3*	-3.2	
Connections were made to the "real world"			4.6	-1.5	
Teacher Qualifications					
Teaching Science 3 Years or Less				-4.8	-4.6
Master's Degree				-3.5	2.9

2015-2016

Science PASS data for 2016 was available for 2,135 students in Laurens 55. Of these, 126 did not have teacher data associated with the record, so these data were excluded from the analysis. The average of the 2016 test scores, without the inclusion of these scores is 622.94 (sd=50.59). The resultant sample of 2,009 student science PASS scores was associated with 48 teachers in Laurens 55.

Of the remaining 2,009 student records included in the sample, 21.5% were in the fourth grade, 19.5% were in the fifth grade, 19.9% were in the sixth grade, 19.1% were in the seventh grade, and

20.0% were in the eighth grade. Students were evenly split between male (49.3%) and female (50.7%), 13.1% were enrolled in a gifted education program, 11.7% had an Individualized Education Plan (IEP), and 5.8% were considered to have limited English proficiency. Similar to the distribution of race and ethnicity of all students in the district, 58.3% of students with available data are White, 27.7% are African American, 10.9% are Hispanic, and 3.1% are of other races. At the time of reporting, the state had yet to release Free and Reduced Lunch information.

Teachers were divided into two groups according to their level of participation in project activities. For purposes of this analysis, teachers were grouped according to the amount of participation in terms of professional development hours. "Intensive" levels of professional development were coded as 100 or more hours, "Light" levels of professional development included 0-99 hours.

Of the teachers who participated in 2016 activities, 12 participated in "intensive" project activities (100 or more hours of professional development), and 36 participated in "light" project activities (0-99 hours of professional development).

Differences in student characteristics between the students of these teachers were tested. Of the 2,009 students for whom all data were available, students whose teacher participated in intensive project activities in 2016 were more likely to be in elementary school (16.7%). Students whose teacher participated in light project activities were also more likely to be in elementary school (52.1%). The proportion of students who are White is significantly higher for teachers who participated in intensive activities (62.5% of students taught by teachers in intensive activities are White compared to 56.7% of students taught by teachers in light activities) (X^2=5.328, df=1, p=0.021). There were no significant differences between the groups in students' gender or IEP status; however, there was a significant difference in the proportion of gifted and talented students served by teachers with intensive training (17.2%) versus light training (11.7%) (X^2=10.371, df=1, p=0.0013).

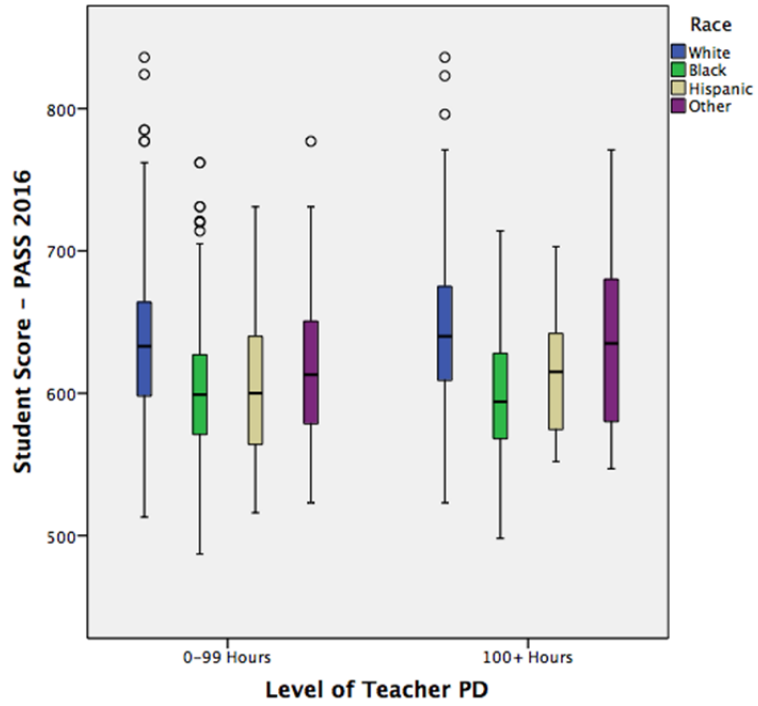
Of the 534 students for whom 2016 scores were available and whose teacher participated in intensive activities during 2016, 30.9% of students did not meet the standard in Science, 43.4% met the standard, and 25.7% scored exemplary. In comparison, of the 1475 students whose teacher participated in 0-99 hours of project activities, 36.8% did not meet the standard, 46.4% met the standard, and 16.8% scored exemplary. Therefore, students whose teacher participated in 100 or more hours of project activities were more likely to score met or exemplary, whereas students whose teacher participated in 0-99 hours were more likely to score not met (X^2=5.75, df=1, p=0.0165). An analysis of average scale scores also indicates that students of teachers with intensive participation have a higher average score (mean=628.94, sd=51.90) than students of teachers with 0-99 hours of participation (mean=620.27, sd=49.9), and the differences are statistically significant (*F=11.61, df=1, p=0.001*).

Figures 11a demonstrates the variability in test scores across both participation groups and selected demographic groups, where the circle represents the average for that group and the error bars represent the 95% confidence interval. Figure 11a represents the average 2016 science PASS score and standard error by participation level and race of the student. This figure indicates that overall, White students score higher on the test than any other demographic group, that the variability in scores for students of other races is quite large, and that African American students whose teachers participated intensively scored lower than any other group. A comparison of grade level achievement by participation group (Figure 11b) shows that students in elementary school have

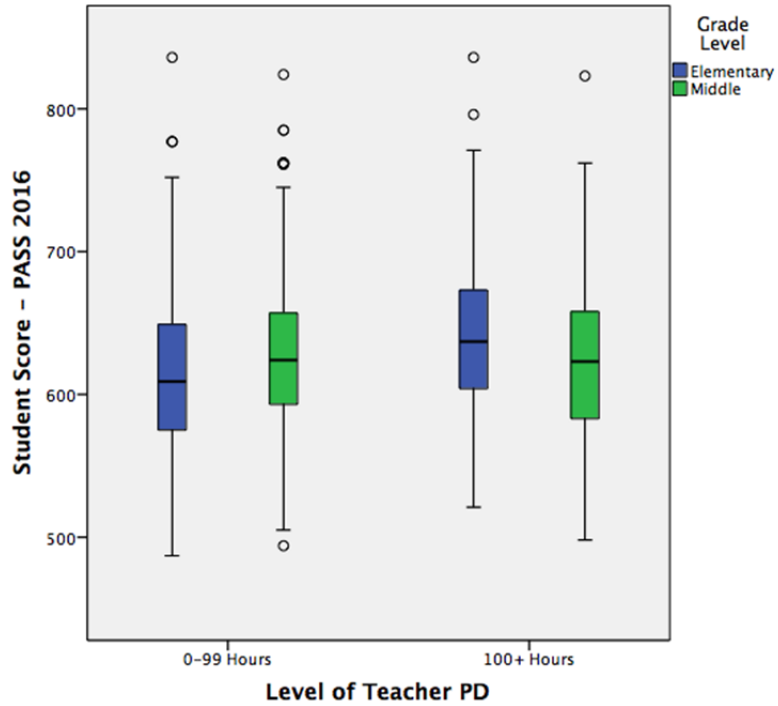
higher average scores if their teacher participated in intensive activities, whereas students in middle school have lower average scores if their teacher participated in intensive project activities.

Figures 11a – 11b: Average 2016 Science Score and Standard Error for Selected Groups

[Figure 11a.]



[Figure 11b.]



To estimate the combined impact of the student variables and teacher participation on student achievement on the 2016 Science PASS test, multiple linear regression estimation was used. The final model used in the analysis is:

$$TestScore_i = \beta_0 + \beta_1 Participation_i + \beta_2 StudentDemographics_i + \beta_3 TeacherEffects_i + u_i$$

Initial analysis of the student control variables (Model 1) indicates that student race accounts for approximately 10.4% of the variation in the 2016 Science PASS test scores (*F=218.8, p<0.001*). Being African American decreases the test score by 27.9 points (*t=-12.7, p<0.001*), and being Hispanic decreases the score by 26.6 points (*t=-8.529, p<0.001).* Students of other races show a decrease in the score by 8.6 points, but this difference is not significant (*t=--1.59, p=0.112*).

Grade level had minimal impact on student test scores, representing only 0.3% of score variation (*F=6.448, p=0.11*). Being in middle school increased the test score by 5.8 points (*t=2.539, p=.011*). Participation in a specialized education program had a significant impact on student performance, and accounted for 24% of the score variation *(F=315.901, p<0.001)*. Having an IEP decreases the test score by 27.7 points (*t=-9.398, p<0.001*), whereas being in a gifted program increases the test score by 59 points (*t=20.87, p<0.001*). Gender, English proficiency, and being of an Other race did not have a significant impact on the model.

Returning to the student control variables and adding teacher participation in project activities increases the adjusted R^2 from .306 to .308. In Model 2, the influence of having an IEP is unchanged (-27.8 points), as is being in a gifted program (+59.1 points), being African American (-27.8 points), and being Hispanic (-26.3 points). However, having a teacher that participated in more intensive training resulted in a 6.7 point increase on student test scores *(t=2.75, p=0.006).*

Table 12. Impact of Participation on Student Achievement - 2016

	Model (1)	Model (2)
Adjusted R2	0.306	0.306
N	2,009	2,009
Student-Level Variables		
Middle School	5.9	5.0
Female	-4.5	-4.4
Individualized Education Plan	-27.7	-27.8
Gifted Education Program	59.5	59,1
Race – African American	-27.9	-27.8
Race – Hispanic	-26.6	-26.3
Race – Other (Non-White)	-8.9	-9,1

Significant changes in data collection and data released by the state impacted the ability to complete additional analyses. At the time of reporting, the state did not release information regarding free and reduced lunch status and student performance on exams. Additionally, a change in staff in the Laurens 55 School District greatly reduced the number of observations done over the 2015-2016 academic year, and observation data collected was not associated with specific teacher names to make comparisons.

Comparison to Similar District

At the time this report was written, assessment score data was not available for Newberry District One (N1). The comparison for 2014-2015 is being provided. When data does become available from N1, the report will be revised.

Baseline Equivalence

To begin, it must first be noted that the size of the districts are slightly different. Laurens District 55 (L55) serves approximately 2,400 students each year and Newberry District One (N1) serves approximately 1,400; whereas Laurens District 56 (L56) serves approximately 900 students. Laurens 55 has four elementary schools, two middle schools, two schools with elementary and middle combined, and one high school. Laurens 56 has three elementary schools, one middle school, and one high school. Newberry has eight elementary schools, three middle schools and three high schools.

Newberry District One is vastly different from Laurens 55 and Laurens 56 on all of the measures of district characteristics and student demographics. However, the measures of teacher qualifications are very similar. There are no significant differences between the districts in the proportion of teachers with advanced degrees ($p=0.120$ and 0.398, *respectively*) returning teachers ($p=0.762$ and 0.795, *respectively*), and professional development days per teacher ($p=0.660$ and 0.220, *respectively*). Of the three, L55 has the lowest average teacher salary ($p<0.001$) and L56 has the highest ($p<0.001$). L55 and L56 have approximately the same student to teacher ratio in core subjects; however, both are significantly greater than that of Newberry ($p=0.010$ and 0.050, *respectively*). Newberry also has the highest dollars spent per pupil ($p<0.001$). In terms of student demographics, L55 and L56 both have significantly larger proportions of students with disabilities ($p<0.001$ and 0.012, *respectively*), significantly larger proportions of students eligible for free and reduced price meals (FRPM) ($p<0.001$), and significantly smaller proportions of minority students, particularly Hispanic students ($p<0.001$).

Table 12: Comparison of Teachers, District Characteristics, and Student Demographics

	L55		L56		Newberry		|L55-N|	|L56-N|
	X	N	X	N	X	N	p	p
Advanced Degrees[1]	56.8%	336	59.0%	65	68.3%	87	0.120[a]	0.398[a]
Returning Teachers[1]	91.9%	336	90.5%	65	90.9%	87	0.762[a]	0.795[a]
Average Teacher Salary[1]	45989	336	48114	65	46966	87	0.000[b]	0.000[b]
PD Days/Teacher[1]	13.4	336	11.6	65	14.4	87	0.660[b]	0.220[b]
S:T Ratio Core[1]	23.7	336	22.6	65	19	87	0.010[b]	0.050[b]
$ Per Pupil[1]	8071	5562	9389	2920	9805	5740	0.000[b]	0.000[b]
% Disabilities[1]	16.5%	5562	15.4%	2920	13.5%	5740	0.000[a]	0.012[a]
% Minority[2]	41.7%	5992	45.3%	3093	53.1%	6035	0.000[a]	0.000[a]
% FRPM[2]	72.0%	5992	69.2%	3093	60.6%	6035	0.000[a]	0.000[a]
Poverty Index[3]	81.38	5562	82.79	2920	76.05	5740	0.147[b]	0.067[b]

[1] Source: 2013 Annual Report Card. http://ed.sc.gov/data/report-cards/2013/index.cfm
[2] Source: 2013-2014 135-day head count. http://ed.sc.gov/data/student-counts/Student_Headcounts/ActiveStudentHeadcounts.cfm
[3] Source: 2013 SC Poverty Index Data File. http://ed.sc.gov/data/report-cards/2013/documents/2013_Report_Card_Poverty_Index.xls
[a] Test of significance is based on the Normal approximation to the binomial distribution and is calculated using the z value.
[b] Test of significance is calculated using the pooled two-sample t procedure. Variance for the x statistics within each school was unknown. The variance for all districts in the state was calculated using the data sources described above and substituted as a proxy measure of variance.

Overall, the proportion of students in L55 who scored met or above on the math PASS (68.2%) is significantly less than the proportion in N1 (72.1%) (*p=0.007*). Grade level achievement on the math PASS in 2014 is similar for L55 as for N1, except in seventh grade (*p=0.010*). In L55, 60.8% of seventh graders scored met or above compared to 70.3% of seventh graders in N1. The proportion of all students in L56 who scored met or above on the math PASS (71.2%) is statistically similar to that of N1 (*p=0.666*). Grade level achievement on the math PASS in 2014 is similar for L56 as for N1, except in the sixth and eighth grades (*p=0.021 and p<0.001, respectively*). In L56, 75.5% of sixth graders scored met or above compared to 64.8% of sixth graders in N1 and 60.8% of eighth graders in L56 scored met or above compared to 76.2% of eighth graders in N1.

Table 13: Comparison of Grade Level Achievement on Math PASS Test in 2014

	L55		L56		Newberry		|L55-N|	|L56-N|
	%Met or Above	N	%Met or Above	N	%Met or Above	N	p	p
3rd Grade	68.7%	435	73.6%	223	69.6%	473	0.764	0.444
4th Grade	72.6%	434	75.3%	226	73.6%	397	0.757	0.716
5th Grade	74.7%	412	72.4%	218	78.7%	436	0.309	0.160
6th Grade	60.6%	441	75.5%	200	64.8%	438	0.348	*0.021*
7th Grade	60.8%	406	70.7%	225	70.3%	475	*0.010*	0.793
8th Grade	71.9%	421	60.8%	232	76.2%	465	0.275	*<0.001*
Total	**68.2%**	**2549**	**71.2%**	**1324**	**72.1%**	**2684**	***0.007***	**0.666**

[a] Test of significance is based on the Normal approximation to the binomial distribution and is calculated using the z value.

Overall, the proportion of students in L55 who scored met or above on the science PASS (67.1%) is statistically similar to the proportion in N1 (66.3%) (*p=0.707*). Grade level achievement on the science PASS in 2014 is also statistically similar for L55 as for N1 in all grades. The proportion of all students in L56 who scored met or above on the science PASS (66.9%) is statistically similar to that of N1 (*p=0.765*). Grade level achievement on the science PASS in 2014 is similar for L56 as for N1, except in the sixth and eighth grades (*p=0.016 and p=0.029, respectively*). In L56, 72.3% of sixth graders scored met or above compared to 55.9% of sixth graders in N1 and 60.3% of eighth graders in L56 scored met or above compared to 73.8% of eighth graders in N1.

Table 14: Comparison of Grade Level Achievement on Science PASS Test in 2014

	L55		L56		Newberry		|L55-N|	|L56-N|
	%Met or Above	N	%Met or Above	N	%Met or Above	N	p	p
3rd Grade	58.4%	219	58.9%	112	57.2%	236	0.772	0.763
4th Grade	70.0%	434	65.0%	226	67.0%	397	0.517	0.701
5th Grade	67.0%	206	71.8%	110	70.4%	219	0.600	0.771
6th Grade	65.5%	223	72.3%	101	55.9%	220	0.094	*0.016*
7th Grade	68.0%	406	71.1%	225	69.5%	475	0.711	0.727
8th Grade	70.0%	210	60.3%	116	73.8%	233	0.537	*0.029*
Total	**67.1%**	**1698**	**66.9%**	**890**	**66.3%**	**1780**	**0.707**	**0.765**

[a] Test of significance is based on the Normal approximation to the binomial distribution and is calculated using the z value.

On the Algebra EOC, a significantly larger proportion of L55 students scored 70 or better on the exam (86.1%) than did N1 students (78.1%) (*p=0.004*). The proportions of students scoring 70 or better on the Biology EOC and scoring 2 or better on the math HSAP are statistically similar for these two districts (*p=0.102 and p=0.570, respectively*). On the math HSAP, a significantly smaller proportion of L56 students scored 2 or better on the exam (69.2%) than did N1 students (78%) (*p=0.034*). The proportions of students scoring 70 or better on the Algebra EOC and the Biology EOC are statistically similar for these two districts (*p=0.780 and p=0.367, respectively*).

Table 15: Comparison of Achievement on High School State Tests in 2014

	L55		L56		Newberry		|L55-N|	|L56-N|
	%Met or Above	N	%Met or Above	N	%Met or Above	N	p	p
Algebra EOC	86.1%	553	77.4%	251	78.1%	423	*0.004*	0.780
Biology EOC	73.1%	457	71.8%	210	67.0%	472	0.102	0.367
Math HSAP	75.7%	428	69.2%	224	78.0%	478	0.570	*0.034*

[a] Test of significance is based on the Normal approximation to the binomial distribution and is calculated using the z value.

The analysis of district characteristics, student demographics, and student achievement for Newberry District 1 as a comparison district for Laurens Districts 55 and 56 indicates that the comparison is imperfect; however, preliminary reviews of other similar districts indicates that Newberry may be the best possible match given the data constraints. Therefore, the analysis will continue using Newberry as a benchmark to determine whether students in Laurens Districts 55 and 56 are achieving at a higher rate than what these students would have under normal circumstances.

Differences in Achievement in 2014-2015

To determine whether the project is having an impact on district-wide achievement, we first examine differences in both the absolute statistic and relative changes in various teacher, district, and student characteristics. Following, we examine the absolute statistic and relative changes in grade level achievement on state standardized tests. Implications for these findings are discussed.

On the items measured, Newberry District One is significantly different from Laurens 55 and Laurens 56. In 2015, Newberry had a significantly larger proportion of teachers with advanced degrees (*p=0.039 and 0.041, respectively*) and a significantly smaller average teacher salary (*p<0.001*). Data on number of professional days per teacher was not reported on the report card. Similar to the baseline year, district characteristics between Laurens districts and Newberry are significantly different. Of the three, L56 has the lowest average student to teacher ratio in core subjects (*p<0.001*). Newberry has the highest dollars spent per pupil (*p<0.001*).

In terms of student demographics, L55 and L56 both have significantly larger proportions of students with disabilities (*p=0.001 and p<0.001, respectively*), significantly larger proportions of students eligible for free and reduced price meals (FRPM) (*p<0.001*), and significantly smaller proportions of minority students, particularly Hispanic students (*p<0.001*).

Table 16: Comparison of Teachers, District Characteristics, and Student Demographics

	L55		L56		Newberry		|L55-N|	|L56-N|
	X	% Change	X	% Change	X	% Change	p	p
Advanced Degrees[1]	56.5%	368	54.6%	185	65.0%	429	0.039[a]	0.041[a]
Returning Teachers[1]	91.2%	368	89.0%	185	87.8%	429	0.237[a]	0.729[a]
Average Teacher Salary[1]	45,930	368	46,757	185	44,928	429	0.000[b]	0.000[b]
S:T Ratio Core[1]	29.5	368	20.6	185	24.1	429	0.003[b]	0.055[b]
$ Per Pupil[1]	8,968	6,082	9,780	3,136	10,167	6,133	0.000[b]	0.000[b]
% Disabilities[1]	16.3%	6,082	17.7%	3,136	13.9%	6,133	0.001[a]	0.000[a]
% Minority[2]	43.3%	6,057	46.2%	3,077	53.4%	6,089	0.000[a]	0.000[a]
% FRPM[2]	72.9%	6,057	77.4%	3,077	68.8%	6,089	0.000[a]	0.000[a]

[1] Source: 2015 Annual Report Card. http://ed.sc.gov/data/report-cards/2013/index.cfm
[2] Source: 2014-2015 135-day head count. http://ed.sc.gov/data/student-counts/Student_Headcounts/ActiveStudentHeadcounts.cfm
[a] Test of significance is based on the Normal approximation to the binomial distribution and is calculated using the z value.
[b] Test of significance is calculated using the pooled two-sample t procedure. Variance for the x statistics within each school was unknown. The variance for all districts in the state was calculated using the data sources described above and substituted as a proxy measure of variance.

In 2015, the state standardized test for math was changed to the ACT Aspire. Overall, the proportion of students in L55 who scored met or above on the math test (41.3%) is significantly less than the proportion in N1 (45.4%) (*p=0.009*). Grade level achievement on the math test in 2015 is similar for L55 as for N1, except in eighth grade (*p=0.030*). In L55, 24.1% of eighth graders

scored met or above compared to 31.9% of eighth graders in N1. These differences are similar to the differences between the two districts' baseline data.

The proportion of all students in L56 who scored met or above on the math test (42.4%) is statistically similar to that of N1 (*p=0.144*). Grade level achievement on the math test in 2015 is similar for L56 as for N1 on all grade levels.

Table 17: Comparison of Grade Level Achievement on Math ACT Aspire in 2015

	L55		L56		Newberry		|L55-N|	|L56-N|
	%Met or Above	N Tested	%Met or Above	N Tested	%Met or Above	N Tested	p	p
3rd Grade	52.5%	469	49.6%	244	56.2%	425	0.431	0.205
4th Grade	42.9%	401	43.6%	220	47.3%	475	0.341	0.527
5th Grade	43.1%	434	46.8%	222	47.6%	400	0.341	0.783
6th Grade	54.9%	419	53.2%	216	58.7%	436	0.425	0.327
7th Grade	29.6%	445	30.3%	198	32.5%	455	0.513	0.684
8th Grade	24.1%	412	29.5%	234	31.9%	461	*0.030*	0.648
Total	**41.3%**	**2580**	**42.4%**	**1334**	**45.4%**	**2652**	***0.009***	**0.144**

[a] Test of significance is based on the Normal approximation to the binomial distribution and is calculated using the z value.

Overall, the proportion of students in L55 who scored met or above on the science PASS (64.8%) is statistically similar to the proportion in N1 (64.4%) (*p=0.769*). Grade level achievement on the science PASS in 2015 is also statistically similar for L55 as for N1 in all grades.

The proportion of all students in L56 who scored met or above on the science PASS (62.9%) is statistically similar to that of N1 (*p=0.536*). Grade level achievement on the science PASS in 2015 is similar for L56 as for N1 in all grades.

Table 18: Comparison of Grade Level Achievement on Science PASS Test in 2015

	L55		L56		Newberry		|L55-N|	|L56-N|
	%Met or Above	N	%Met or Above	N	%Met or Above	N	p	p
4th Grade	68.5%	401	59.5%	220	65.9%	475	0.572	0.210
5th Grade	59.6%	433	59.9%	222	61.8%	400	0.646	0.716
6th Grade	63.9%	418	60.8%	217	65.8%	436	0.674	0.363
7th Grade	69.3%	445	66.0%	200	62.3%	457	0.069	0.529
8th Grade	62.9%	410	68.0%	234	66.0%	459	0.506	0.694
Total	**64.8%**	**2107**	**62.9%**	**1093**	**64.4%**	**2227**	**0.769**	**0.536**

[a] Test of significance is based on the Normal approximation to the binomial distribution and is calculated using the z value.

On the Algebra EOC, a significantly smaller proportion of L55 students scored 70 or better on the exam (75.5%) than did N1 students (86.7%) (*p<0.001*). The proportions of students scoring 70 or better on the Biology EOC and scoring Ready on the math ACT and science ACT are statistically similar for these two districts (*p=0.308, 0.716, and 0.779, respectively*).

On the Biology EOC, a significantly larger proportion of L56 students scored 70 or better on the exam (87.3%) than did N1 students (67.5%) (*p<0.001*). The proportions of students scoring 70 or better on the Algebra EOC and scoring Ready on the math ACT and science ACT are statistically similar for these two districts (*p=0.786, 0.260, and 0.606, respectively*).

Table 19: Comparison of Achievement on High School State Tests in 2015

	L55		L56		Newberry		|L55-N|	|L56-N|
	%Met or Above	N	%Met or Above	N	%Met or Above	N	p	p
Algebra EOC	75.5%	454	87.2%	195	86.7%	450	*0.000*	0.786
Biology EOC	71.9%	400	87.3%	220	67.5%	434	0.308	*0.000*
Math ACT	14.7%	367	11.4%	202	15.9%	422	0.716	0.260
Science ACT	11.3%	364	13.9%	202	11.8%	422	0.779	0.606

[a] Test of significance is based on the Normal approximation to the binomial distribution and is calculated using the z value.

Overall, there were no observed differences in outcome achievement between Laurens District 55 and Newberry School District that were greater than differences observed during the baseline year, with the exception of the Algebra EOC, for which the outcomes declined. There were also no observed differences in outcome achievement between Laurens District 56 and Newberry School District that were greater than differences observed during the baseline year, with the exception of the Biology EOC, for which the outcomes improved.

FINDINGS PART IV: GOVERNMENT PERFORMANCE AND RESULTS ACT (GPRA)

This section reports on the federal Government Performance and Results Act (GPRA) measures established for this grant. The results of measurements are reported and variances discussed.

GPRA Measure 1: Teacher Content Knowledge

The specific GPRA measure is "the percentage of teachers who significantly increase their content knowledge in mathematics and science, as reflected in project-level pre- and post-assessments."

Teacher content knowledge in math and science was measured using pre and post assessments developed by the College of Charleston MSP project. The electronic spreadsheet supplied by the MSP federal program office was used to determine the number of teachers who showed significant gains in math and science content knowledge. This spreadsheet uses a "dependent t-test (for 30 or more respondents) or the Wilcoxon signed ranks test (for less than 30 respondents) to calculate, with 85 percent certainty, the number of teachers who showed significant gains".

Of the 295 teachers and staff who participated in professional development opportunities, 185 participated in at least one of the courses that provided math content (a total of 223 participations). Three of these teachers completed both the pre-test and the post-test on math content knowledge. Teachers with an improvement of nine points or more from the pre-test to the post-test were considered to have made a significant improvement ($W=1.61, p=0.05$). Of these three, one (33.3%) achieved significant gains in math content knowledge from the pre-test to the post-test.

One hundred and thirty nine teachers participated in at least one of the courses that provided science content (a total of 166 participations). None of the teachers completed both the pre-test and the post-test on science content knowledge.

GPRA Measure 2: Students at the Basic Level or Below in State Assessments of Mathematics or Science

The specific GPRA measure is "The percentage of students in classrooms of MSP teachers who score at the basic level or below in State assessments of mathematics or science."

. Algebra End of Course tests are not administered to every high school student and are taken by some middle school students. Therefore, it is unknown at this time how many students were taught by the teachers served. however, efforts are being made to obtain this information from the districts. For the purposes of this report, the total number of students in the two districts (9,122) is used as the total number of students served. In Laurens 55, 1,712 (65.87%) of the 2,599 students who completed the math SC READY in 2016 did not meet the readiness benchmark and 95 (19.0%) of the 500 students who completed the Algebra End of Course (EOC) test and were served by participating teachers did not pass the test (scored less than 70 points). In Laurens 56, 886 (66.32%) of the 1,336 students who completed the math SC READY in 2015 did not meet the

readiness benchmark and 70 (31.7%) of the 227 students who completed the Algebra EOC test did not pass the test. All together, 2,763 students (59.3%) did not meet the state standard.

The science PASS and Biology End of Course tests are not administered to every student. Therefore, it is unknown at this time how many students were taught by the teachers served. For the purposes of this report, the total number of students in the two districts (9,122) is used as the total number of students served. In Laurens 55, 845 (39.6%) of the 2,134 students who completed the science PASS in 2016 and were served by participating teachers scored not met and 137 (34.3%) of the 399 students who completed the Biology End of Course (EOC) test and were served by participating teachers did not pass the test (scored less than 70 points). In Laurens 56, 447 (40.5%) of the 1,105 students who completed the science PASS in 2015 scored not met and 34 (18.3%) of the 186 students who completed the Biology EOC test did not pass the test. All together, 1463 students (38.3%) did not meet the state standard.

GPRA Measure 3: Students at the Proficient Level or Above in State Assessments of Mathematics or Science

The specific GPRA measure is "The percentage of students in classrooms of MSP teachers who score at the proficient level or above in State assessments of mathematics or science."

Algebra End of Course tests are not administered to every high school student and are taken by some middle school students. Therefore, it is unknown at this time how many students were taught by the teachers served. however, efforts are being made to obtain this information from the districts. For the purposes of this report, the total number of students in the two districts (9,122) is used as the total number of students served. In Laurens 55, 887 (34.13%) of the 2,599 students who completed the math SC READY in 2016 meet or exceeded the readiness benchmark and 405 (81.0%) of the 500 students who completed the Algebra End of Course (EOC) test and were served by participating teachers passed the test (scored 70 or higher points). In Laurens 56, 450 (33.68%) of the 1,336 students who completed the math SC READY in 2015 met the readiness benchmark and 157 (68.3%) of the 227 students who completed the Algebra EOC test passed the test. All together, 1899 students (40.7%) met or exceeded the state standard.

The science PASS and Biology End of Course tests are not administered to every student. Therefore, it is unknown at this time how many students were taught by the teachers served. For the purposes of this report, the total number of students in the two districts (9,122) is used as the total number of students served. In Laurens 55, 1289 (60.4%) of the 2,134 students who completed the science PASS in 2016 and were served by participating teachers scored met or higher and 262 (65.7%) of the 399 students who completed the Biology End of Course (EOC) test and were served by participating teachers passed the test (scored 70 points or higher). In Laurens 56, 658 (59.5%) of the 1,105 students who completed the science PASS in 2015 scored met or higher and 152 (81.7%) of the 186 students who completed the Biology EOC test passed the test. All together, 2361 students (61.7%) met or exceeded the state standard.

GPRA Measure 4: Experimental or Quasi-Experimental Evaluation Design

The specific GPRA measure is "The percentage of MSP projects that report using experimental or quasi-experimental design for their evaluations."

The outcome evaluation design is quasi-experimental. Teacher and student achievement data is divided into three groups for comparison: teachers participating in the Summer Institute, teachers participating in graduate courses, and teachers not taking part in the Institute or graduate portions of the project (the comparison group). Entry into the groups is through self-selection. If the comparison group teachers moved into the experimental group or out of the district, they were replaced in each year by other randomly selected teachers. In each year, attrition rates were monitored to ensure that at least 70% of the original sample was included in the analysis. If the attrition rate exceeded 15 points, the difference was accounted for in the statistical analysis. Baseline equivalence of each group was measured to determine if significant differences in teacher credentials or demographics exist and any differences will be accounted for in the analysis.

The outcome evaluation first measured progress toward achieving the objectives to determine the overall impact of the project. Due to embargoes placed by the State Department of Education on the distribution of data, the receipt of data was delayed and was not able to be included in this report. The report will be updated with this information in November.

In years two and three of the grant, the effect of each type of professional development activity offered (Summer Institute, graduate courses, and district-provided mini-courses) was examined by comparing changes in teacher content knowledge, teacher instructional practices, and student academic achievement among each group of teachers. Regression statistics were used to account for differences in student demographics and teacher credentials and to measure the significance of the relationship. Finally, differences between achievement rates of Laurens students and Newberry County students was to be analyzed to determine if differences in achievement are greater than what would normally be expected of students. It was presumed that Newberry would be a suitable comparison due to its geographic proximity and similarities in district policies, student demographics, and student academic achievement. The appropriateness of using Newberry County as a comparison is examined in the findings by evaluating differences in number of professional development days, number of teachers with advanced degrees, and other staff characteristics.

GPRA Measure 5: Scientifically Valid Evaluation Results

The specific GPRA measure is "The percentage of MSP projects that use experimental or quasi experimental design for their evaluations that are conducted successfully and that yield scientifically valid results."

The evaluation conducted for the 2015-2016 grant year is the third year evaluation of a three year grant. The evaluation has set up the study to measure the impact of the project in a scientifically valid manner, using a comparison among the students of Laurens 55 and 56 teachers taking part in the program (the experimental group) and the students of teachers who did not take part in the

program (the comparison group. In addition, a comparison was to be made with student outcomes in a similar school district that does not have an MSP program. However, the data to make the district to district comparison could not be made at the time of the writing of this report due to a State Department of Education embargo on the necessary data. The report will be amended when the data becomes available. The evaluation quasi-experimental design was therefore successful and scientifically valid for one of the two design methods, but was not completed for the other design method.

CONCLUSIONS

1. The project was implemented quite effectively. The project management team and instructional coaches were flexible in adjusting specifics to achieve the planned activities of the project. This included changes to the Summer Institute and specific partners. All of the activities were achieved at or above the degree planned.

2. With one exception, all of the outcome measures regarding improvements in teacher professional development, teacher content knowledge and teacher instructional skills were met or progress is being made towards meeting them. The measurement of teacher content knowledge was somewhat hampered by fewer teachers than is optimal taking the pre-post knowledge test.

3. There has been a decline in the standardized test scores of students in both District 55 and 56 on standardized tests over the last three years. In two one cases (Algebra End of Course test), the decline between 2014 and 2015 and 2015 and 2016 is statistically significant. The program is, therefore, not meeting the objective of improving standardized test scores at this time.

4. It was not possible to report on the districts objective of narrowing the achievement gap between the state Annual Measurement Objective (AMO) and the average scale score for special needs students due to this data not being available from the state at the time of the writing of this report. However, the districts did meet this objective in 2014-2015.

5. For 2014-2015, The analysis of the comparison among three groups of teachers ("intensive" project activities (summer institute and/or graduate courses), "light" project activities (district mini courses, coaching, and other district-provided professional development), and "none" of the project activities) indicates that students whose teacher participated in any project activities are more likely to score met, whereas students whose teacher did not participate are more likely to score either not met or exemplary. The differences in test scores are not what would be expected when comparing the intensive, light and no project activities groups. To estimate the combined impact of the student variables, teacher data, and teacher participation on student achievement on the 2015 Science PASS test, multiple linear regression estimation was conducted.

Taken together with the differences in student demographics across groups, it appears that participation in intensive project activities does not have a significant influence because these teachers are more likely to teach students who are White, are not receiving free or reduced lunch, and are in middle school, and these students traditionally have higher test scores to begin with and see less change in their scores year over year. African American students whose teacher participates in intensive activities see an average decrease in scores of 14.1 points whereas African American students whose teacher participates in light activities see an average increase in scores of 4.5 points and African American students whose teacher participates in no activities sees an average decrease in scores of 1.8 and this interaction accounts for 8% of the variation in test scores.

6. For 2015-2016 analysis of a comparison between outcomes for students of teachers, teachers were divided into two groups according to their level of participation in project activities. For purposes of this analysis, teachers were grouped according to the amount of participation in terms of professional development hours. "Intensive" levels of professional development were coded as

100 or more hours, “Light” levels of professional development included 0-99 hours. Most of the teachers were teaching in elementary school.

Students whose teacher participated in 100 or more hours of project activities were more likely to score met or exemplary on the science PASS, whereas students whose teacher participated in 0-99 hours were more likely to score not met. An analysis of average scale scores also indicates that students of teachers with intensive participation have a higher average score than students of teachers with 0-99 hours of participation and the differences are statistically significant.

These differences could be attributable to variations among the students of the two groups of teachers. The proportion of students who are White is significantly higher for teachers who participated in intensive activities (62.5% of students taught by teachers in intensive activities are White compared to 56.7% of students taught by teachers in light activities) There were no significant differences between the groups in students’ gender or IEP status; however, there was a significant difference in the proportion of gifted and talented students served by teachers with intensive training (17.2%) versus light training (11.7%). However, after taking these differences into account, having a teacher that participated in more intensive training resulted in a 6.7 point increase on student test scores.

RECOMMENDATIONS

It is recommended that:

1. The project staff continue the flexibility exhibited in the implementation of the project.

2. There be a review of the decline in student test scores.

3. There be a review of the decline in participation in professional development in District 56.

4. The project staff examine the self-selection process of teachers for particular continuing education to determine whether project activities lend themselves better to teachers who are teaching certain subjects or classrooms that do not reach African Americans and the less affluent.

APPENDIX ONE:
INSTRUMENTS

APPENDIX TWO:
PROFESSIONAL DEVELOPMENT ACTIVITIES

APPENDIX THREE:
SUMMER INSTITUTE SCHEDULE