Texas Lesson Study

Professional Development Program:
Report on Program Effectiveness 2017-2018

Chase Young, Ph.D.

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EVALUATOR INFORMATION

This report was written by Chase Young, an associate professor in the School of Teaching and Learning at Sam Houston State University. He was awarded his Ph.D. in Reading Education from the University of North Texas in 2012. Prior to entering higher education, he taught elementary school and also served as a reading specialist.

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EXECUTIVE SUMMARY

Brief Background

The Texas Education Agency (TEA) began piloting the Lesson Study professional development program in fall 2016 as part of the TEA strategic plan, which was set forth by Texas Commissioner of Education Mike Morath. This report describes the results of a study conducted during the 2017–2018 school year. Lesson Study is inquiry-based, job-embedded professional development where teachers work collaboratively to develop, teach, and assess research-based lessons. The purpose of Lesson Study is to help teachers improve their effectiveness, share best practices with other teachers, improve student outcomes, and provide a platform to demonstrate mastery within the teaching profession. Research suggests that Lesson Study can positively impact teachers' knowledge and beliefs (Lewis, Perry, & Hurd, 2009).

Through Lesson Study, teachers identify a research theme and student expectation(s) from the Texas Essential Knowledge and Skills (TEKS) that students have difficulty mastering. Teachers work together to build knowledge of subject matter and student thinking, develop collaborative lesson plans, teach the lesson, observe each other in the classroom, and reflect on their observations to improve learning outcomes for students (Lewis & Hurd, 2011; Stepanek, Appel, Leong, Turner Mangan, & Mitchel, 2007).

The Texas Education Agency (TEA) included 16 education service centers (ESCs) during the 2017–2018 school year to examine potential benefits of Lesson Study. Data were collected in the form of surveys, in-person interviews, and locally-designed assessments. This report focuses on changes to teacher self-efficacy, student performance on assessments, and the perceptions of Lesson Study facilitators, teachers, administrators, and students regarding the effectiveness of the program.

The yearlong study included 702 teachers from 60 school districts. Teachers were combined into 1 of 198 Lesson Study groups. The lessons created by the groups were then delivered to over 13,000 students in Texas across grades K–12. Although most of the Lesson Study groups focused on English language arts and reading or mathematics, there were a number of groups that designed lessons in science and social studies.

Teachers who participated in Lesson Study reported statistically higher levels of (a) confidence in teacher abilities, (b) the time they received to collaborate with colleagues, (c) feelings of expertise in the content area taught, and (d) being comfortable discussing their classroom with others ($p < .05$)[1]. These gains were considered to be small to moderate[2]. In another efficacy survey, teachers reported gains in a) crafting good questions for students, b) using a variety of assessment strategies, c) providing alternate examples to alleviate confusion, and d) implementing alternative strategies in the classroom. The gains were also considered small to moderate. The facilitators reported that nearly all of the teachers participated with

[1]Probability value (p) less than .05 suggests that observed differences in the sample are less likely to be due to chance (i.e., random fluctuations in the data).

[2] Cohen's d is the difference between two means expressed in terms of standard deviation (i.e., average variability within the data). The use of a standardized metric can be beneficial, particularly when measures used to quantify a construct (e.g., self-efficacy) and the scores associated with these measures are subject to change. Cohen (1992) provides some general guidelines for interpretation of these standardized mean differences although comparisons are most meaningful in the context of findings from related literature.

an open mind, were patient, flexible, optimistic, enthusiastic, responsible, and worked diligently and effectively in groups. Seventy-seven percent of teachers and 90 percent of administrators reported that the Lesson Study impacted the teachers' professional growth. Teachers found the lesson planning process challenging but found the ability to reflect on the lesson and debrief with colleagues to be beneficial.

Most of the teachers and administrators reported that the process also impacted student growth. Overall, the results of the students who were pre- and post-tested suggest that the process had a large effect on their academic performance (d = .91). The greatest gains were observed in ESCs 3 and 4 and the mean difference effect sizes were considered large. Lesson Study had moderate effects in ESCs 5, 8, and 10, and small effects were observed in ESC 6. When comparing grade levels across regions, primary grade (prekindergarten–2) students' post-test mean scores were the highest. Finally, most students indicated that they understood most or all of the lessons (90%) and enjoyed them (67%).

INTRODUCTION

The Texas Education Agency (TEA) examined the benefits of the Lesson Study professional development program during the 2017–2018 school year. Lesson Study is a part of the TEA strategic plan (FY 2017–2021) set forth by Texas Commissioner of Education Mike Morath "to improve teacher in-service training and support by introducing teacher-driven, reflective, job-embedded professional development and structures" (TEA, 2016, p. 4). Teachers develop and submit research lessons to TEA for review. The best lesson proposals are shared with teachers across the state on the Texas Gateway. This report details findings from the 2017–2018 Lesson Study professional development program.

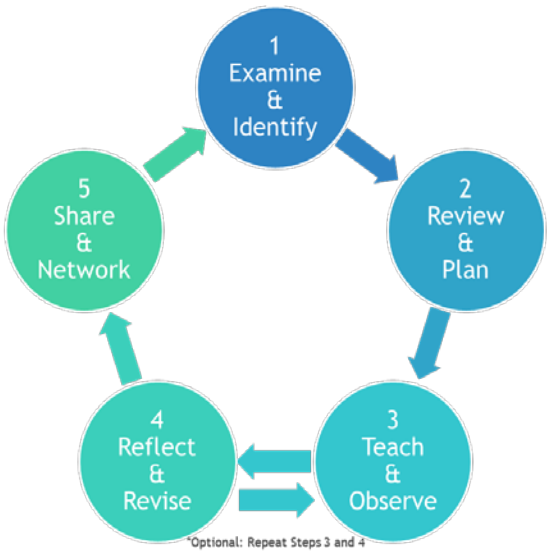
Overview of Lesson Study

Lesson Study is a form of job-embedded, professional development for teachers that uses a systematic process to foster a collaborative, professional environment (Stepanek, Appel, Leong, Turner Mangan, & Mitchel, 2007). Lesson Study is distinct in that teachers develop, teach, and assess research-based lessons. The use of Lesson Study in the United States is new but has expanded in recent years given evidence it can positively impact teachers' knowledge and beliefs (Lewis, Perry, & Hurd, 2009).

The Lesson Study process is illustrated in Figure 1. Teachers collaborate in teams of 2 to 5 to:

- identify a research theme and student expectation(s) (SEs) from the TEKS that students have difficulty understanding;
- research best instructional practices for the identified SEs and plan a strategic, research-based lesson;
- teach the lesson to students and collect data on students' responses, levels of engagement, and learning processes;
- reflect on the lesson and options for refinement; and
- share the teacher-designed, research-based lesson, and report on the lesson effectiveness with other teaching professionals via the Texas Gateway site.

Figure 1. Illustration of the Lesson Study Process.



Summary of the Spring 2017 Pilot Study

The spring 2017 pilot included 109 teachers from 25 schools and 15 school districts and 33 Lesson Study groups. Teachers who participated in the Lesson Study process reported statistically higher levels of (a) confidence about their teaching ability and (b) feelings about being an expert in the content area they taught ($p < .05$). These gains were considered to be moderate to large and consistent with findings from the fall 2016 pilot. In contrast to findings from fall 2016, teachers in the spring 2017 pilot also reported gains in (a) the time they received to collaborate with colleagues and (b) seeing their colleagues as experts. Overall, eighty-four percent (84.3%) of participating teachers reported that Lesson Study impacted their professional growth. This finding was supported by the comments of school administrators.

Student performance was also compared through locally developed assessments designed by the Lesson Study groups. Students demonstrated statistically significant gains ($p < .05$) from pre-test to post-test. Students reported that they understood most or all of the lessons (88.9%) and enjoyed them (63.4%). Students further reported that the use of group work incorporated by the lessons was the activity they enjoyed most and the activity that helped them to learn best.

Purpose and Goal of the 2017–2018 Lesson Study

The Texas Education Agency contracted with 16 of the 20 education service center regions to examine the Lesson Study professional development program in select districts and campuses throughout the regions. This report examines to what extent the Lesson Study professional development program met the expected outcomes as outlined in program documents. The following questions guided this evaluation report:

1. How did the Lesson Study professional development program affect teachers' sense of self-efficacy?
2. What were the perceptions of teachers and administrators about the Lesson Study process?
3. How did the students' performance change after participating in the lessons?
4. What were the differences in post-test scores among ESCs, grade levels, and academic subjects?
5. What were the perceptions of students about the lessons developed through the Lesson Study process?

METHOD

Data Collection

Data were collected from ESC facilitators, teachers, administrators, and students throughout the Lesson Study cycles. Lesson Study facilitators responded to a survey on the attitudes of their group members and provided observations about the Lesson Study. Teachers completed a pre-test and post-test survey about their level of self-efficacy and reflections on the Lesson Study process after each phase. In addition, an administrator at each of the participating schools was asked to complete a survey about their observations of the Lesson Study professional development program. Lastly, students were given assessments to evaluate what they learned from the research-based lesson. The student assessments were developed by teachers within each Lesson Study group. Students were also invited to respond to a brief survey and an in-person interview about their experience with the lesson. A copy of all surveys can be found in Appendix A.

Participants

Collectively, 110 schools from 60 school districts across the state participated in the professional development program (See Appendix C for complete list of participating schools and districts.). A list of all participating ESCs is provided in Table 1. There were 37 facilitators and a total of 702 teachers that participated in Texas Lesson Study (TXLS). Approximately 13,174 students were assessed on their learning, and over 8,513 students completed surveys intended to determine how students viewed the research-based lessons. In addition, 727 students were interviewed to further investigate their perceptions of the lessons developed during the Lesson Study process.

Table 1. Participants by Education Service Center

ESC Region	# of Districts	# of Campuses	# of Unique Groups
3	5	7	8
4	3	6	9
5	2	6	8
6	6	11	24
7	4	5	8
8	1	2	8
9	2	4	8
10	4	8	11
11	2	4	8
12	3	3	7
13	8	20	38
14	7	14	23
15	4	4	4
16	2	5	8
17	2	3	11
20	5	8	16
Total	60	110	199

Lesson Study Implementation

Lesson Study participants were combined into groups. Groups consisted of two to five individuals who were guided through the Lesson Study process (Figure 1) by a facilitator from one of the regional ESCs. Facilitators either hosted a summer workshop for participants or met weekly with each group during the 2017–2018 school year to go through the Lesson Study process.

Groups identified a target grade level, subject area, and TEKS for the Lesson Study work, although the construct of the Lesson Study groups varied based on the campus size and needs. For example, groups were comprised of teachers that taught the same subject, grade level, or sometimes a combination of the two (e.g., a group of third-grade math teachers; a group of sixth, seventh, and eighth-grade science teachers, etc.).

The number of Lesson Study groups are reported by grade level in Figure 2. Groups created lessons for grade levels ranging from prekindergarten (Pre-K) to grade 12. In addition, there were classrooms specified as technology, special education, and art. Most groups created lessons for elementary students, with the majority of lessons being delivered in grade 4. In some instances, teachers within a group targeted more than one grade level. Some groups reported collaboratively working across grade levels, most often in grades 3–5 or 6–8. In rare cases, groups indicated they worked collaboratively at the "high school" level but did not specify the grade levels involved. The number of Lesson Study groups is reported by subject area in Figure 3. Most groups focused on either language arts or mathematics.

Figure 2. Frequency of Participating Grade Levels

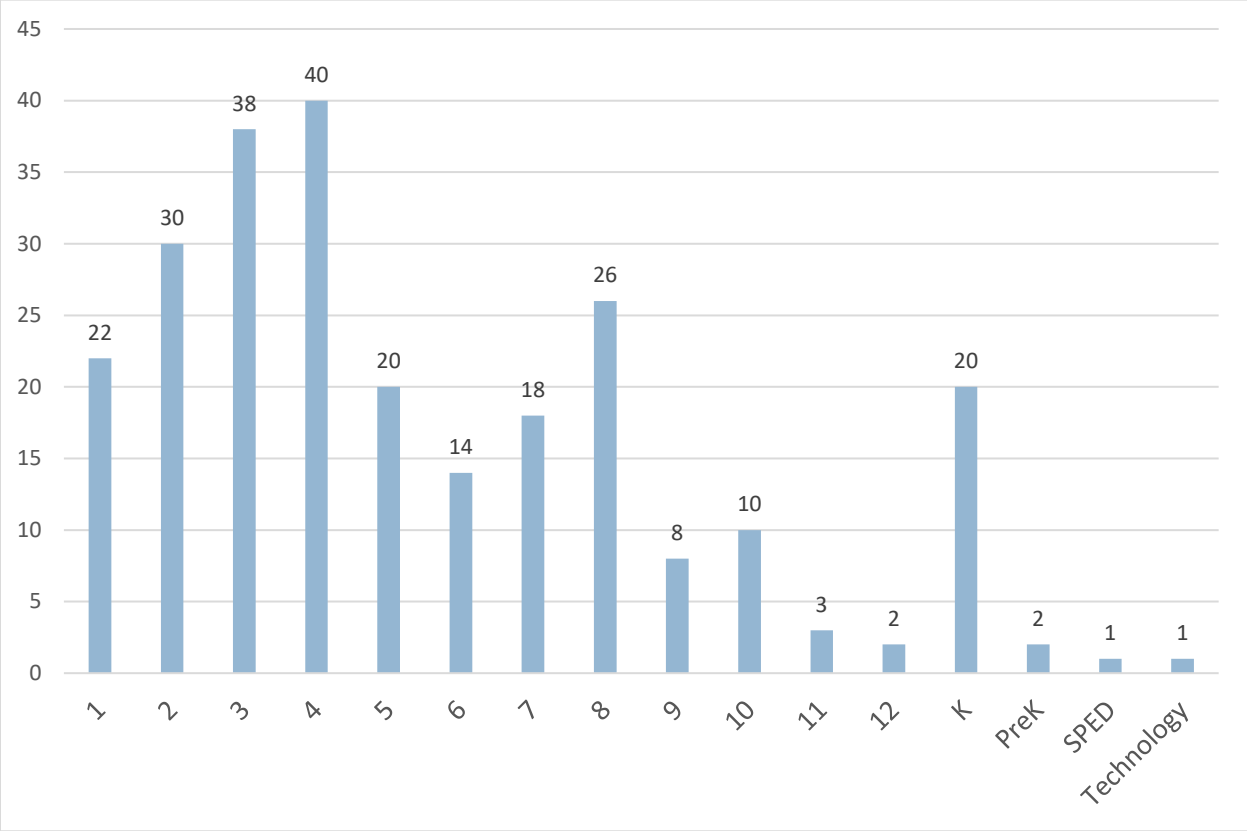
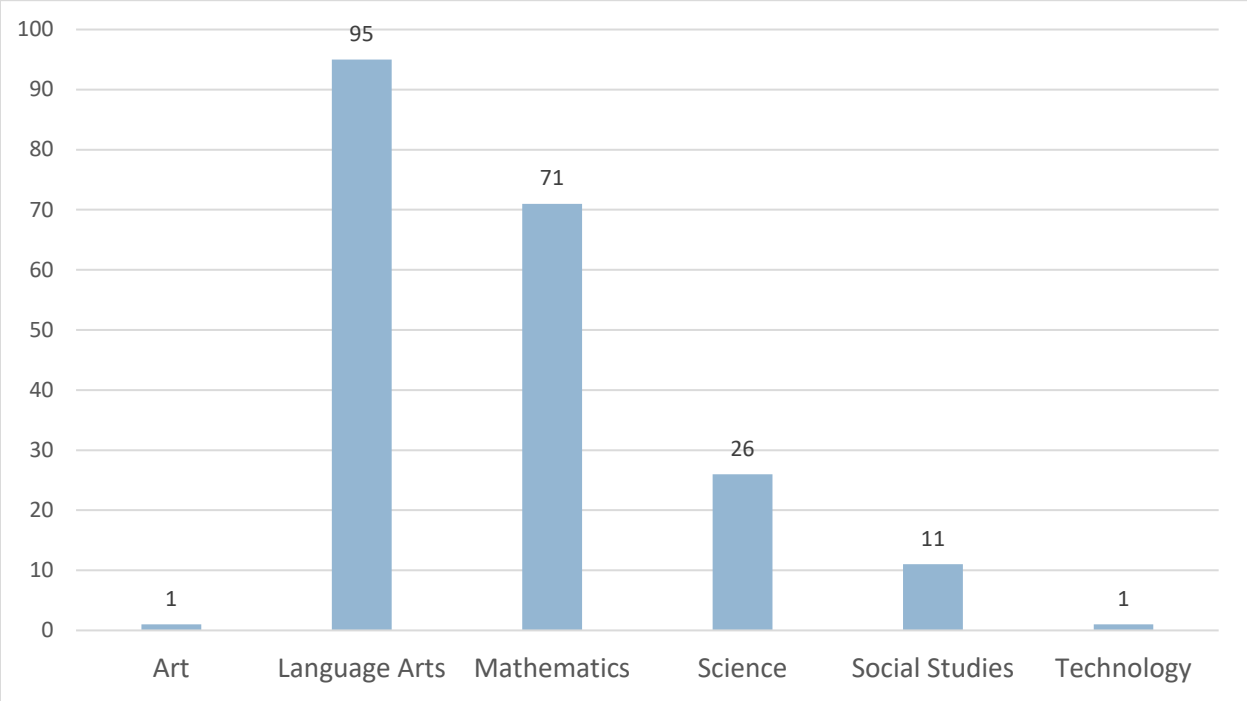


Figure 3. Number of Lesson Study Groups by Subject



RESULTS

Q1. How did the Lesson Study professional development pilot program affect teachers' sense of self-efficacy?

A pre-test and post-test survey of teacher self-efficacy (Appendix A) were completed online before and after the Lesson Study cycle. This survey was developed by the program managers from each of the coordinating ESCs (i.e., ESC 6, ESC 13, ESC 14) and the TEA project director. The analysis only included data that were complete and accurate, and thus, 580 of the 1,046 responses were included in the final analysis. The internal consistency of scores from the pre-test survey was $\alpha = .69$[3], and the internal consistency of scores from the post-test survey was $\alpha = .71$. The results of the pre-test and post-test surveys are reported in Table 2.

[3] Alpha (α) is a measure of internal consistency which refers to how consistent the items on a test measure a single construct or concepts.

Teacher participant responses varied from pre-test and post-test. To better evaluate those differences, the scores from the pre-test survey and post-test survey items were compared using an independent samples *t*-test (α = .05). The results of the *t*-test indicated that the scores of four survey items were statistically different from pre-test to post-test. Teachers reported gains in (a) confidence in teacher abilities, (b) the time they received to collaborate with colleagues, (c) feelings of expertise in the content area taught, and (d) being more comfortable discussing their classroom with others. The greatest gains were found on teachers' confidence in their teaching ability, and the effect was moderate (*d* = .58)[4].

Teachers were asked to answer four additional questions that were procured from the Teachers Sense of Efficacy Scale (Tschannen-Moran & Woolfolk Hoy, 2001). The results of the independent samples *t*-test indicated that the scores of the items were statistically different from pre-test to post-test. Teachers reported gains in all four areas, a) crafting good questions for students, b) using a variety of assessment strategies, c) providing alternate examples to alleviate confusion, and d) implementing alternative strategies in the classroom. All of the effects were moderate except for the ability to provide examples to alleviate confusion, which had a small effect. The means, standard deviations, and effect sizes are reported in Table 3.

[4] Cohen (1992) was used as a general guide for the interpretation of standardized mean differences.

Table 2. Means, Standard Deviations, and Standardized Mean Differences of Teacher Self-Efficacy Scores (N = 580)

	Spring 2018				
	Pre-Test (*N*=236)		Post-Test (*N*=344)		
Teacher Self-Efficacy	***M***	***SD***	***M***	***SD***	***ES***
1. I am confident in my teaching abilities.	4.08	0.70	4.46	0.59	0.58*
2. I would recommend the teaching profession to others.	3.67	0.97	3.75	1.01	0.08
3. I receive adequate time to collaborate with my colleagues.	3.28	1.17	3.67	1.06	0.35*
4. I am an expert in the content that I teach.	3.68	0.85	4.01	0.73	0.41*
5. I am comfortable discussing my classroom with others.	4.58	0.62	4.71	0.51	0.22*
6. I feel like a respected professional.	3.97	0.87	4.09	0.90	0.12
7. I view my colleagues as experts in the field of teaching.	4.25	0.74	4.29	0.73	0.05
8. Collaborative professional development positively impacts student learning.	4.67	0.56	4.69	0.52	0.05
Internal Consistency Reliability (α)	.69		.71		

Note: ES, effect size as measured by Cohen's d, .2=small effect, .5=moderate effect, .8=large effect.
* Statistically significant ($p < .05$).

Table 3. Means, Standard Deviations, and Standardized Mean Differences of Teacher Self-Efficacy Scores (N = 580)

	Spring 2018				
	Pre-Test (*N*=236)		Post-Test (*N*=344)		
Teachers' Sense of Efficacy Scale	***M***	***SD***	***M***	***SD***	***ES***
1. To what extent can you craft good questions for your students? (How much can you do?)	3.78	.65	4.16	.58	0.62*
2. How much can you use a variety of assessment strategies? (How much can you do?)	3.78	.72	4.11	.61	0.50*
3. To what extent can you provide an alternative explanation or example when students are confused? (How much can you do?)	4.05	.69	4.31	.60	0.41*
4. How well can you implement alternative strategies in your classroom? (How much can you do?)	3.82	.68	4.17	.61	0.55*
Internal Consistency Reliability (α)	.78		.75		

Note: ES, effect size as measured by Cohen's d, .2=small effect, .5=moderate effect, .8=large effect.
* Statistically significant ($p < .05$).

Q2. What were the perceptions of facilitators and participants about the Lesson Study process?

Perceptions of Facilitators

Facilitators were asked to respond to a brief survey after each phase of the Lesson Study process (Appendix A). The percent of facilitators that indicated group members met or exceeded expectation is reported in Table 4. Percentages are reported for the initial and final group meetings only. Facilitators generally reported that group members met or exceeded their expectations during each phase of the Lesson Study in both the fall and spring; however, these percentages generally decreased in the spring cycle.

Table 4. Percent of Facilitators Indicating Group Members Met or Exceeded Expectations

Facilitator Reflections about Group Members	% Fall (N = 293)	% Spring (N = 286)
Open and non-judgmental to other's opinions and ideas	98	95
Patient and flexible	97	95
Optimistic and enthusiastic	96	91
Prepared with materials, resources, and ideas	94	90
Share responsibility and follow through with their meeting roles	94	91
Understand the phase of the Lesson Study cycle in which they are working	97	95
Listen to each other and ask questions	97	93
Contribute to the discussion	96	94
Stay on task	96	91

Facilitators were also invited to identify practices that assisted in the success of the Lesson Study process through an open-ended survey question. The most salient theme that emerged from those were comments about the effective data and research tools that were available and how those tools promoted collaboration among teachers.

Collaborating Around Data and Research

The data and research tools available to participants of the Lesson Study were generally well-received and helped to facilitate discussions and served as a foundation for collaboration. Facilitators reported that teachers aptly identified relevant research to improve instruction based on various data analyses.

> *"The teachers did a great job with really looking at the data and trends they found. The Data Dig was a great strategy."*

"The teachers are very open to discuss strengths and weaknesses of their students as well as their own. Teachers want to get better and see their students succeed. After looking at their data, choosing the standard, and discussing the way they have taught in the past, teachers came to the realization that it was probably not the best way to teach this concept. They started to collaborate about other ways of teaching it and this knowledge is guiding their research."

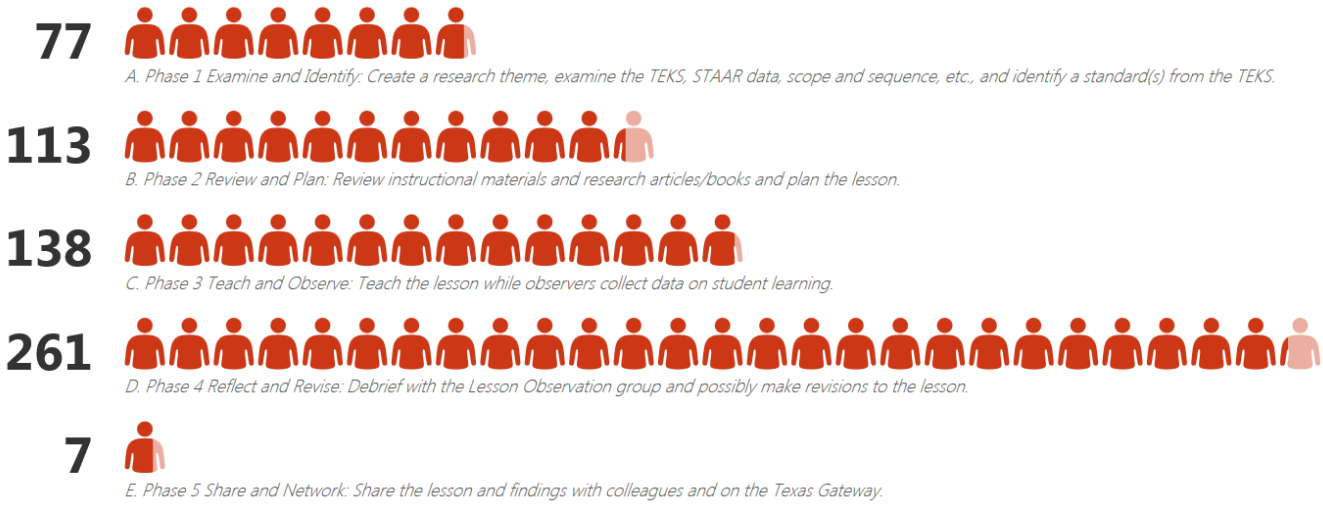
"The teachers were excited to use Gale & EBSCO databases for genuine research."

"Using the Data to Interventions data packet from Region 10 and other historical data helped the teachers see which specific TEKS they wanted to target and use as leverage points for their focus of the research lesson."

Perceptions of Teachers

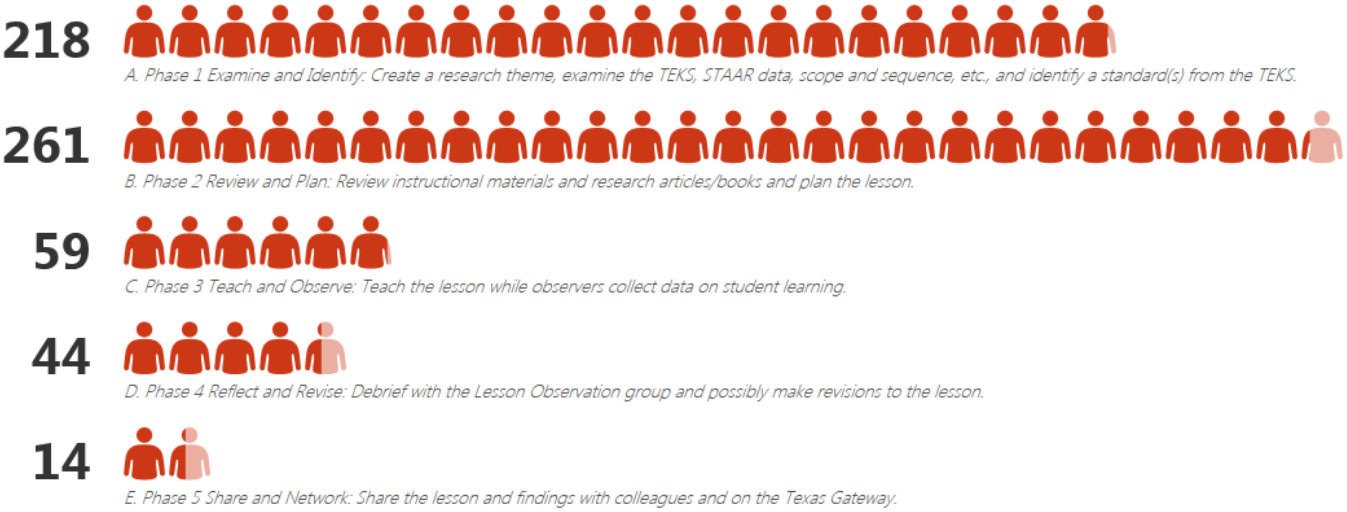
Teacher participants were invited to respond to a Teacher Reflection survey (Appendix A) given at the end of the Lesson Study cycle. As part of these surveys, teacher participants were asked to identify the phase of the lesson study that they believed was most beneficial. Forty-two percent of the teachers believed reflecting and revising to be the most beneficial phase. A summary of the teacher responses can be found in Figure 4.

Figure 4. The Most Beneficial Phase of the Lesson Study (N = 618)



Teachers were also asked to report the most challenging phase of the Lesson Study process. Results indicated that the planning process was most difficult. Thirty-five percent of teachers indicated that Phase 1 was the most challenging, and 42 percent of teachers perceived Phase 2 as the most challenging. These two phases focused mainly on the planning process. Conversely, teachers appeared to be comfortable with teaching, observing, reflecting, and sharing their lessons (Phases 3–5). The results are summarized in Figure 5.

Figure 5. The Most Challenging Phase of the Lesson Study (N = 618)

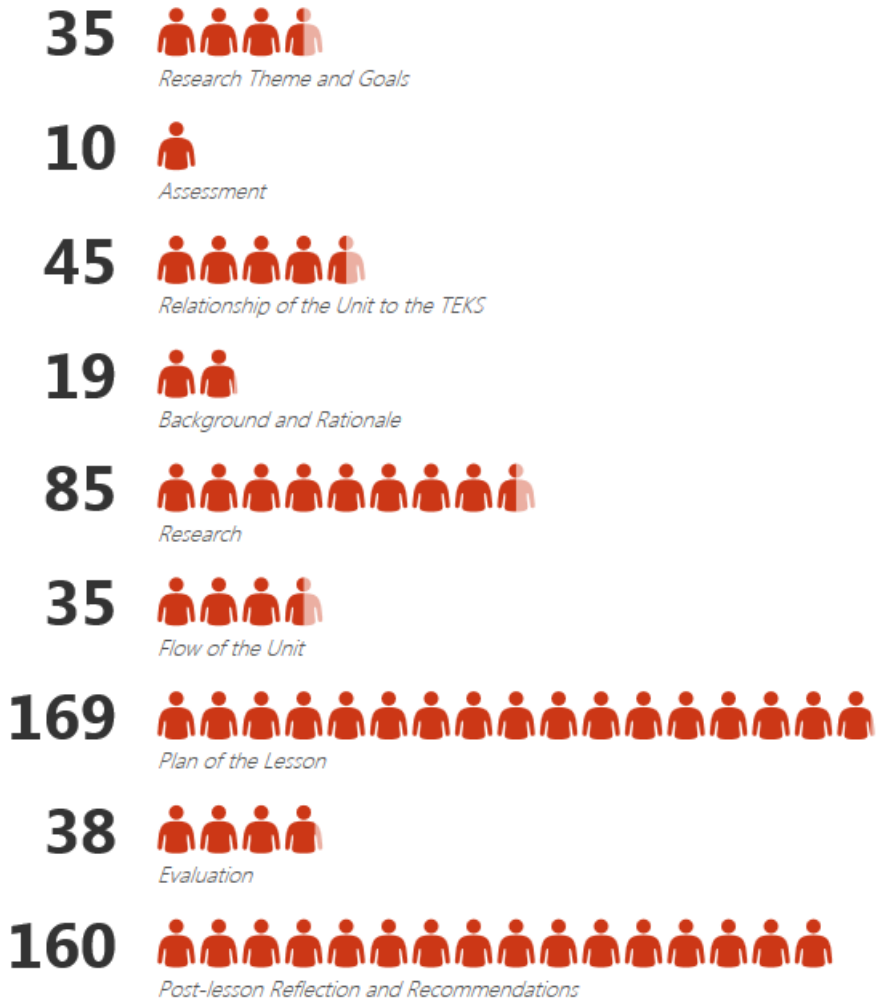


Most Beneficial for Teaching Practice

Lastly, teachers were asked which section of the Lesson Study they viewed as most beneficial for their teaching practice. The most common response was planning the lesson (Figure 6). When reviewing the qualitative data, teachers who valued the lesson planning process clearly benefited from the collaborative approach.

> *"It was beneficial collaborating on a shared lesson and observing different teaching styles. And then coming together and discussing the different parts and getting different perspectives."*
>
> *"It is always nice to be able to talk with your team and gather every member's knowledge and expertise to build something solid."*
>
> *"Planning a lesson with others helped me discover new ways to teach the material."*

Figure 6. The Most Beneficial Section of Lesson Study for Teaching Practice (N = 618)



Student and Professional Growth

The percent of teacher participants that responded favorably to questions about student and professional growth is reported in Table 5. Most teachers reported that Lesson Study positively impacted student growth (77%) and their own professional growth (83%). Further, most teachers reported that the process of collecting data during the lesson observation provided insight into the learning process (81%).

Table 5. Percent of Teachers Who Responded Favorably to Questions about Student and Professional Growth (N = 618)

Question	%
Did you have sufficient time to go through the Lesson Study process?	77
Participation in Lesson Study has impacted student growth.	77
Participation in Lesson Study has impacted my professional growth.	83
By having teachers and outside educators collect data during the Lesson Observation, I had greater insight into the learning process and students' understanding of the objective(s).	81

Continued Lesson Study and Stipends

The percent of teachers who responded favorably to repeating the Lesson Study process without a stipend is reported in Table 6. A little less than half of the teachers participating in the Lesson Study reported that they would be willing to participate in Lesson Study again (46%). However, only 15 percent of teachers would participate in the Lesson Study without receiving a stipend, while 37 percent were unsure. One teacher summed up many of the respondents' qualitative remarks, "This is a very beneficial process. Although, it is very time consuming for teachers. A stipend helps to compensate for the time spent on creating the lesson."

Table 6. Percent of Teachers Who Responded Favorably to Repeating Lesson Study and Without Receiving a Stipend

Question	%
I would like to go through the Lesson Study process again.	46
Would you participate in Lesson Study again without receiving a stipend?	15

Perceptions of School Administrators

Administrators from each school that participated in the Lesson Study during the 2017–2018 school year were asked to complete a survey about the professional development program (Appendix A). From 16 regions, a total of 114 principals completed the survey. Of the 76 percent of administrators that indicated they were able to sit in on the Lesson Study sessions, about 60 percent agreed that the Lesson Study sessions were more in-depth than typical team discussions.

Teacher conversations were often described using words such as "focused," "deep," "collaborative," "valuable," and "purposeful."

> *"Discussions were reflective, productive and cross-curricular in nature."*
>
> *"The teachers were fully engaged in collaboration and discussion which lead to a successful lesson design."*

"They were more complex than usual planning. There were a reason and purpose to every minute of the planning . . ."

The percent of administrators that responded favorably to survey items are reported in Table 7. Most administrators indicated that Lesson Study impacted both students' (84%) and teachers' professional growth (90%). These responses were slightly higher than what was reported by administrators during the fall 2016 and spring 2017 pilot studies. Many administrators (82%) also believed that the lessons designed though Lesson Study were aligned to the T-TESS framework.

Table 7. Percent of Administrators Who Responded Favorably to Post-Survey Items (N = 114)

Question	Frequency	%
Lesson Study impacted student growth	96	84
Lesson Study impacted teachers' professional growth	103	90
The designed lesson is aligned to the T-TESS framework	93	82

When asked how the Lesson Study impacted teachers, many administrators commented that Lesson Study helped participants work collaboratively and reflectively. The administrators also claimed that the teachers' involvement in the process resulted in increased rigor, differentiation, and innovation.

"The lesson study provided the teachers the opportunity to be reflective in their practices and research new ways to engage students."

"The lesson study has helped them in their planning and collaboration together. It's helped them to learn how to make lessons more rigorous and to differentiate the lessons to meet the needs of all students."

"It required them to be intentional, collaborative, and reflective regarding a particular lesson."

"The teachers were able to collaborate at a high level. They worked cohesively as a team, had deep discussions, and challenged one another in their thinking. They were able to have many debates that brought them together to make decisions about the lesson. Overall, this process brought our teachers closer with one another while strengthening them in their teaching field."

School administrators were also asked about what changes they would recommend for the Lesson Study professional development program, and many of the administrators spoke positively about the current process, stating often that they "would not change a thing." The most salient recommendations from school administrators were to shorten the time commitment for participants and condense the timeframe for the Lesson Study cycle. Some school sites also indicated that finding coverage for multiple teachers during the Lesson Observation was difficult. In addition, the administrators seemed to favor the fall implementation over the spring because of state testing in the spring semester.

"Possibly shorten the number of weeks, as teachers were concerned about being out of their classrooms so much."

"It seems unrealistic to teachers to spend an entire semester to plan one lesson. I understand the point is about the process and not necessarily all about the final product. But, that doesn't necessarily resonate with teachers that have to have a well-planned lesson ready every day."

School Administrator Interest in Future Lesson Studies

School administrators were asked about their interest in implementing Lesson Study campus-wide and their willingness to incorporate Lesson Study meetings into their campus-wide professional development plan. Fifty-three percent indicated they could likely integrate it (Table 8). Only 25 percent of school administrators reported that they were willing to implement Lesson Study campus-wide, while 57 percent were unsure. Administrators were concerned about the time commitment on behalf of the teachers; however, several administrators mentioned that the process would likely benefit the teachers and students.

Table 8. Percent of School Administrators Who Responded "Yes" or "Maybe" to Questions about Lesson Study in the Future (N = 114)

Question	Yes %	Maybe %
Are you interested in implementing Lesson Study campus wide?	25	57
Could you see Lesson Study as part of your campus-wide professional development program?	53	37

Q3. How did the performance of students change after participating in the lessons?

Student Participants

During the year-long study, 13,174 students participated in this study and were involved in at least one of the lessons as part of Lesson Study. (Note: 24,735 total students had at least one teacher that participated in Lesson Study and may have received the Lesson Study lesson.) The students were given a post-test to demonstrate their learning. Some of the students were given an optional pre-test which measured their growth as a result of the lesson. Students were also surveyed to gather their perceptions of the lessons. Finally, 727 students involved in Lesson Study participated in one-on-one interviews.

Summary of Student Participant Pre- and Post-Test Scores

Of the 13,174 student participants, 4,491 completed both a pre-test and post-test assessment. Not all service centers were represented because the students did not complete the optional pre-test. In addition, three ESCs were not included because of the low number of students who completed both the pre-test and post-test, including ESC 11 (n = 38), ESC 13 (n = 95), and ESC 20 (n = 31). It was decided that these smaller numbers of students should not represent the entire ESC. The means and standard deviations of the pre-test and post-test assessments that were included in the analysis are reported in Table 9. These

means were tested using a paired samples *t*-test. The result of these tests indicated students made statistically significant gains from their pre-tests to post- tests ($p < .05$) in all three groups. On average, the magnitude of those gains was 0.91 standard deviations, which is considered a large effect. The largest gains were reported among students in the ESC 4 group ($d = 1.65$). The smallest gains were reported among students in the ESC 6 group ($d = .38$). Collectively, there was an overall increase of approximately 27 percent.

Table 9. Means and Standard Deviations of Student Pre- and Post-Test Lesson Study Assessments (N = 4,491)

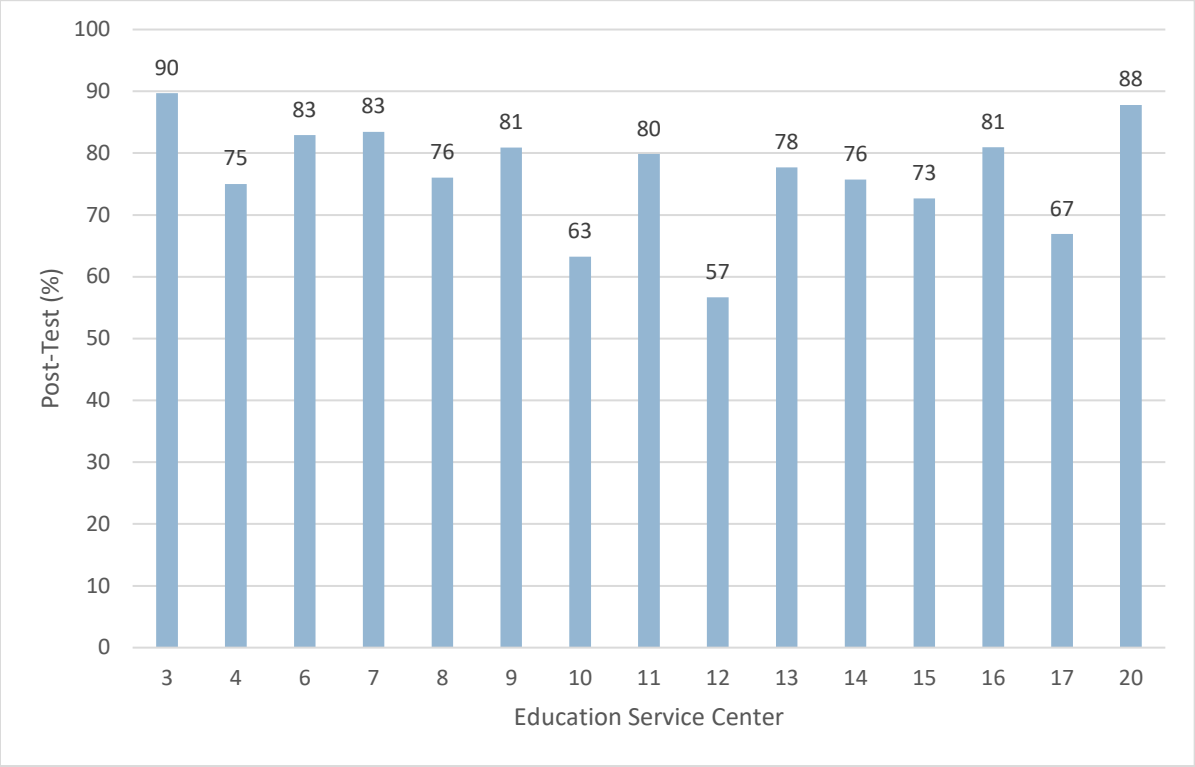
		Pre-Test		Post-Test		
ESC	*N*	*M*	*SD*	*M*	*SD*	*ES*
ESC 3	253	50.46	26.46	89.08	19.19	1.29*
ESC 4	438	21.53	26.66	71.26	22.61	1.65*
ESC 5	908	51.76	29.88	72.15	20.83	.70*
ESC 6	888	69.38	22.78	78.64	20.45	.38*
ESC 8	1244	45.46	28.63	70.19	26.20	.76*
ESC 10	760	50.51	24.19	69.49	24.60	.65*

Note: Means reflect the percent of correct responses to the assessment developed by the Lesson Study group. ES, effect size as measured by Cohen's *d*, .2 = small effect, .5 = moderate effect, .8 = large effect.
* Statistically significant ($p < .05$)

Summary of Student Participant Post-Test Scores

Of the 13,174 student participants, 8,683 only completed the post-test. The post-test mean scores were compared by ESC. An analysis of variance among ESCs revealed statistical differences among students' post-test scores, $F(14,148) = 4.29$, $p < .05$. Differences are illustrated in Figure 7. A full list of ESC post-test mean scores by group can be found in Appendix B.

Figure 7. Student Participant Post-Test Mean Scores by ESC (N = 8,683)



Post-test scores were also analyzed by grade level groups. There were 163 Lesson Study groups that completed the post-test. These groups were combined into grade level ranges, namely, high school (grades 9–12), middle school (grades 6–8), intermediate (grades 3–5), and primary (Pre-K–2). An analysis of variance between groups was conducted and the results indicated statistically significant differences among grade level ranges, $F(3,159) = 7.89$, $p < .05$. Pairwise comparisons indicated that primary grade students significantly outperformed students in the intermediate grades and high school ($p < .05$). In addition, students in middle school significantly outperformed those in high school. There were no other significant comparisons. According to Table 10, the primary students' post-test mean scores were highest and high school mean scores were the lowest.

Table 10. Means and Standard Deviations of Lesson Study Groups' Post-Test Scores by Grade Level Range

Grade Level Range	***M (%)***	***SD (%)***	***N***
High School (9-12)	66.87	16.12	15
Middle School (6-8)	78.89	12.69	40
Intermediate (3-5)	73.87	15.09	67
Primary (Pre-K-2)	83.89	9.77	41
Total	**76.98**	**14.29**	**163**

Note: *N* = the number of Lesson Study groups.

Lesson Study groups were also analyzed by academic subject. An analysis of variance revealed no statistically significant differences among subject areas taught. The means and standard deviations of the Texas Lesson Study groups are summarized in Table 11, which indicates students' post-test mean scores in science and social studies were slightly higher than the other subject areas tested. Students' post-test scores in math were the lowest.

Table 11. Means and Standard Deviations of Lesson Study Groups' Post-Test Scores by Subject

Subject	***M (%)***	***SD (%)***	***N***
ELAR	77.49	14.66	89
Math	73.54	13.98	49
Science	81.63	12.61	16
Social Studies	82.94	12.88	8
Technology	77.5	0	1
Total	**76.98**	**14.29**	**163**

Note: *N* = the number of lesson study groups.

Q4. What were the perceptions of students about the lessons?

Student Responses to the Post-Lesson Survey

Students were also invited to respond to a survey about their opinions of the lesson (Appendix A). Most of the surveys were complete with the exception of 52 students who did not complete one or more questions. In addition, seven kindergarten classrooms and two Pre-K classrooms did not attempt the survey. Student responses on how well they understood the lesson are reported by category in Table 12. Overall, 90 percent of students from the study indicated that they understood most or all of the lesson[5]. Thus, there was only a small percentage that reported having difficulty with lessons.

Table 12. Student Perceptions about How Well They Understood the Lesson

	N	**Understood the lesson**	**Understood most of the lesson**	**Somewhat confused**	**Did not understand**
All Surveyed Students	8,446	55%	35%	8%	2%

Student participants were also asked about the difficulty of the work associated with the lesson. Student responses are reported in Table 13. Seventy-seven percent of students responded that the level of work was just right for the lesson. Only a small percentage of students reported that the lesson was too difficult.

[5] This number was computed by adding the percent of students who "understood the lesson" and "understood most of the lesson" reported in Table 12.

Table 13. Student Perceptions About the Level of the Work Associated with the Lesson

	N	Too Hard	Just Right	Too Easy
All Surveyed Students	8,513	7%	77%	16%

The percent of students who thought the lesson was similar to their typical lessons is reported in Table 14. Overall, responses were split evenly, in that 50 percent believed the lesson offered during the Lesson Study was typical of other lessons and 50 percent believed the lessons were different.

Table 14. Percent of Students Who Indicated the Lesson Was Similar or Different than Other Lessons (N = 8,513)

All Surveyed Students	**%**
Similar to other lessons	50
Different than other lessons	50

The percent of students that responded favorably to how well they enjoyed the lesson is reported in Table 15. Overall, most students reported they enjoyed the lessons developed by the Lesson Study groups (67%).

Table 15. Percent of Students Who Responded Favorably to the Lesson (N = 8,419)

	N	%
Fall 2016	5,605	67

Note: % reflects the percent of students who responded, "strongly agree" or "agree."

Student In-Person Interviews

Lastly, of the students who participated in the lessons, three students from each group were invited to engage in a separate in-person interview (Appendix A). This resulted in 727 interviews conducted by the Lesson Study facilitators. Many of the comments from those interviews were specific to the individual lessons delivered by the Lesson Study groups. However, there were some general themes identified from data. A number of students said they liked being "creative" and viewed the lessons as "fun." They also reported that they enjoyed working and learning together. Finally, many students mentioned that the lessons produced in the study were more engaging than typical lessons.

> *"Creatively think out of the box to plan something."*
>
> *"I think doing the actual lab was fun and working with different things instead of just taking notes."*
>
> *"We were all doing it together instead of doing it by myself. So, they could teach me how they did it, and I could teach them my way."*
>
> *"I enjoyed when we were working together in teams and when we were doing teamwork because I think that is a really good lesson that we will use later in life."*
>
> *"I enjoyed that it was fun and interesting. It was better than what we normally do."*

SUMMARY AND RECOMMENDATIONS

Summary

This report detailed findings from the Lesson Study professional development program implemented during the 2017–2018 school year. The study examined data from 37 facilitators, 114 administrators, 702 teachers, and approximately 13,174 students from 60 different districts across Texas. The major goals of the study were to determine how participation in the study affected teachers' self-efficacy, evaluate the perceptions of administrators and teachers involved in the process, analyze student performance, and consider the students' perspective regarding the lessons developed in the Texas Lesson Study process.

How did the Lesson Study professional development program affect teachers' sense of self-efficacy?

One of the goals of the Lesson Study professional development program was to improve teachers' sense of self-efficacy. The results from a survey revealed gains in (a) confidence in teacher abilities, (b) the time they received to collaborate with colleagues, (c) feelings of expertise in the content area taught, and (d) being comfortable discussing their classroom with others. In the second part of the efficacy survey, teachers reported gains in a) crafting good questions for students, b) using a variety of assessment strategies, c) providing alternate examples to alleviate confusion, and d) implementing alternative strategies in the classroom. The gains were also considered small to moderate.

What were the perceptions of teachers and administrators about the Lesson Study process?

Lesson Study facilitators, teachers, and administrators were also asked about their perceptions of the Lesson Study process. First, facilitators indicated that nearly all of the teachers participated with an open mind, were patient, flexible, optimistic, enthusiastic, responsible, and worked diligently and effectively in groups.

Participating in Lesson Study also promoted growth among teachers and students. Seventy-seven percent of teachers and 90 percent of administrators reported that the Lesson Study impacted the teachers' professional growth, a direct aim of the program. In addition to professional growth, 84 percent of administrators and 77 percent of teachers noted that the process also impacted student growth. Teachers indicated that being able to debrief and reflect with their Lesson Study group and spend ample time planning the lessons positively enhanced the process. Although teachers indicated the planning process to be most beneficial, they also claimed the process was quite time consuming.

How did the students' performance change after participating in the lessons?

Overall, the results of the students who were pre- and post-tested indicated that the process had a large effect on student performance (d = .91). The greatest gains were observed in ESCs 3 and 4 and the mean difference effect sizes were considered large. Lesson Study had moderate effects in ESCs 5, 8, and 10. Small effects were observed in ESC 6.

What were the differences in post-test scores among ESCs, grade levels, and academic subjects?

On average, students across service centers and groups demonstrated 76.98 percent mastery on the locally developed assessments, however, the performance varied across ESCs. When considering grade levels, primary grade students significantly outperformed students in the intermediate grades and high school, and middle school students significantly outperformed those in high school. The primary students' post-test mean scores were highest among the grade level ranges compared. There were no statistical differences on the basis of academic subject areas, but the descriptive data indicated that the highest mean performances were in science and social studies.

What were the perceptions of students about the lessons developed through the Lesson Study process?

Most students indicated that they understood most or all of the lessons (90%) and enjoyed them (67%). Seventy-seven percent of the students believed the lesson's level of difficulty was "just right." Half of the students surveyed believed the lesson developed during the process was different than their regular instruction. From the interviews, many of the students reported the lessons to be engaging for a variety of reasons.

Recommendations

The evidence collected from the Lesson Study process suggested value for both teachers and students. The following recommendations are offered to help guide program managers of the Lesson Study professional development program:

- **Continue to provide external and financial support.** Most of the administrators surveyed were not inclined to expand the program campus-wide. Continuing external support may help facilitate this process. Teachers were also less inclined to participate in the process without receiving a stipend. Most teachers indicated the stipend was an adequate incentive for the time spent on the process.
- **Recruit additional content area teachers.** Although most of the Lesson Study groups focused on language arts and mathematics, students post-tested in science and social studies had higher mean scores.
- **Consider integrating groups at some point during the Lesson Study process.** Because of differing student performance among academic subject areas, it might benefit teachers of various disciplines to work together in the Lesson Study process, perhaps during planning or reflection. The multiple perspectives and pedagogical approaches may stimulate productive discussions that result in better lessons.
- **Explore ways Lesson Study participants can share what was learned through the Lesson Study process.** The reflection process for the Lesson Study cycle generally occurs within the Lesson Study groups, but there may be opportunities for participants to also share what was learned with non-participants (i.e., teachers within their schools). This may extend the value and reach of the Lesson Study program.

- **Reassure primary grade teachers that the process can benefit their students.** According to the qualitative responses, several primary grade teachers mentioned that the Lesson Study process might be best suited for higher grade levels. Yet, the quantitative data revealed the highest test scores among those students in grades Pre-K–2.
- **Reiterate that the process is not simply about creating one lesson.** Although teachers produce a tangible lesson that is delivered, the process itself serves as a means for developing the teachers' abilities, which can be transferred to other contexts. For example, the process helped teachers diversify their assessments, use of examples, and classroom strategies, which are important for any learning situation.
- **Remind teachers of the purpose.** Teachers should be aware that the process is not punitive or meant to be condescending. Rather, it is an opportunity to work collaboratively, teach, reflect, and understand one's strengths and areas for improvement. Moreover, the survey results indicate that teachers made the greatest gains in confidence, and thus, should be reminded that the results of the process are often positive.
- **Continue to provide opportunities to reflect and debrief with colleagues.** Teachers found that reflecting and debriefing with their colleagues to be the most beneficial part of the Lesson Study process.
- **Continue to allow teachers to plan collaboratively.** Teachers reported that planning had the greatest impact on their teaching practice.
- **Standardize or evaluate the locally developed assessments.** Using locally developed assessments to compare students or groups is a limitation because it is unclear whether the assessments were developed similarly. Thus, results should be very cautiously interpreted. To eliminate this issue, groups could be offered standardized assessments, or a team of experts could evaluate the assessments after the fact to determine what conclusions could be drawn.
- **Consider making the pre-test mandatory.** An effective means for evaluating a program involves an analysis of students' growth. Post-test scores essentially describe performance differences and not differences in academic growth.
- **Identify similar classrooms to serve in a control group.** While many of the results were positive, it would be informative to know whether the Lesson Study process is more effective than some current practices already in place.
- **Elicit potential revisions to the process from teachers.** Seventy-seven percent of teachers believed there was an impact on students' growth. Seventy-seven percent of students believed the lessons were "just right" in regard to difficulty. The post-test scores indicated that students demonstrated approximately 77 percent of mastery on their locally developed tests. Teachers' perceptions aligned well with those of the students as well as their performance on the assessments. Teachers' suggestions for revisions could be considered in order to increase the impact of the Lesson Study on students' achievement.
- **Time continues to be a concern.** The process should be evaluated at every step to find ways to increase effectiveness while considering efficiency.

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APPENDIX A: Lesson Study Surveys

1. Teacher Self-Efficacy Survey (Pre/Post) via Google Form

1. Which ESC Region do you teach in?
2. What is your email address? (The email address will be used to send a post-survey and the data analysis, but individual results will not be shared with the district.)

Section 1

For Part 1, please share your thoughts on the teaching profession. (Answer choices are on a five-point Likert scale from Strongly Disagree to Strongly Agree.)

3. I am confident in my teaching abilities.
4. I would recommend the teaching profession to a student, friend, or relative.
5. I receive adequate time to collaborate with my colleagues.
6. I am an expert in the content that I teach.
7. I am comfortable discussing what goes on in my classroom with my colleagues.
8. I feel like a respected professional.
9. I view my colleagues as experts in the field of teaching.
10. I believe that taking part in collaborative professional development opportunities positively impacts student learning.

Section 2

Part 2 is designed to help us gain a better understanding of the kinds of things that create difficulties for teachers in their school activities. Please indicate your opinion about each of the statements below.[6]

11. To what extent can you craft good questions for your students? (How much can you do? Nothing, Very Little, Some Influence, Quite a Bit, A Great Deal)
12. How much can you use a variety of assessment strategies? (How much can you do? Nothing, Very Little, Some Influence, Quite a Bit, A Great Deal)
13. To what extent can you provide an alternative explanation or example when students are confused? (How much can you do? Nothing, Very Little, Some Influence, Quite a Bit, A Great Deal)
14. How well can you implement alternative strategies in your classroom? (How much can you do? Nothing, Very Little, Some Influence, Quite a Bit, A Great Deal)
15. Other comments or questions

[6] Questions 11–14 are from the *Teachers' Sense of Efficacy Scale (TSES)*.

2. Teacher Reflection via Google Form

Congratulations on finishing a phase of the Texas Lesson Study cycle! The feedback you provide will be used to make programmatic improvements. Please take your time and respond honestly and thoroughly. Thank you for your insight.

Section 1

1. In which ESC region do you teach? (short response)
2. Who is your outside facilitator? (short response)
3. Which Lesson Study phase did you recently complete?
    a. Phase 1: Examine & Identify
    b. Phase 2: Review & Plan
    c. Phase 3: Teach & Observe
    d. Phase 4: Reflect & Revise
    e. Phase 5: Share & Network

Section 2 (Phase 1)[7]

In this phase, your team created a Research Theme, identified a student expectation(s) from the TEKS, set goals, and drafted the Background and Rationale.

4. Which of the listed components was the most beneficial to your practice? Why?
    a. Creating a Research Theme
    b. Identifying a student expectation from the TEKS
    c. Setting Unit and Research Lesson goals
    d. Drafting the Background and Rationale
5. Which of the listed components was the most challenging? Why?
    a. Creating a Research Theme
    b. Identifying a student expectation from the TEKS
    c. Setting Unit and Research Lesson goals
    d. Drafting the Background and Rationale

OR Section 2 (Phase 2)

In this phase, your team reflected on and summarized research findings, designed formative assessments, mapped out the Unit Timeline, and designed the Research Lesson.

6. Which of the listed components was the most beneficial to your practice? Why?
    a. Reflecting on and summarizing research findings
    b. Designing formative assessments
    c. Mapping out the Unit Timeline
    d. Designing the Research Lesson
7. Which of the listed components was the most challenging? Why?
    a. Reflecting on and summarizing research findings
    b. Designing formative assessments
    c. Mapping out the Unit Timeline
    d. Designing the Research Lesson

[7] Section 2 will change based the phase completed by the TXLS group.

OR Section 2 (Phases 3 & 4)

In these phases, your team taught and observed the Research Lesson while collecting data on student learning. The team then reflected on the Research Lesson, made revisions to the lesson, and may have retaught the lesson. You may have also heard from a final commentator (outside observer).

8. Which of the listed components was the most beneficial to your practice? Why?
    a. Teaching the Research Lesson
    b. Observing and collecting data on student engagement
    c. Reflecting on and discussing the Research Lesson and collected data
    d. Revising the Research Lesson
    e. Reteaching the Research Lesson
    f. Hearing from a final commentator (outside observer)
9. Which of the listed components was the most challenging? Why?
    a. Teaching the Research Lesson
    b. Observing and collecting data on student engagement
    c. Reflecting on and discussing the Research Lesson and collected data
    d. Revising the Research Lesson
    e. Reteaching the Research Lesson
    f. Hearing from a final commentator (outside observer)

Section 3

(Note: The responses are on a five-point Likert scale from Strongly Disagree to Strongly Agree.)

10. The outside facilitator was prepared, open to our ideas, and encouraged discussion.
11. I understood the objective(s)/purpose of our Lesson Study meetings.
12. I was given the opportunity to share my ideas and felt listened to.
13. We achieved our meeting objectives by the end of each meeting.
14. Research informed our decisions and discussions during this phase.
15. Our Lesson Study work during this phase will lead to improved student outcomes for our selected TEKS.
16. If you could summarize your work in this phase, what have you learned or what has your team accomplished?
17. Other comments or questions

3. Teacher End-of-Cycle Survey via Survey Monkey

Congratulations on completing the Texas Lesson Study cycle! The Texas Education Agency and regional service center ask that you complete this survey to give feedback on your experience with Texas Lesson Study.

1. Survey completer contact information:
    a. School Campus Name
    b. District Name
    c. Email Address (This will be used to ensure all participants have completed the survey.)
2. In which Educational Region is your district located?
3. Which of the following best describes your role in Texas Lesson Study for this semester?
    a. Participating Teacher (participated in Lesson Study with an ESC Facilitator)
    b. Teacher Lead (served as the main facilitator for the Lesson Study group)
    c. Instructional Coach Participant (participated in a Lesson Study group)
    d. Instructional Coach Lead (served as the main facilitator for the Lesson Study group)
    e. Teacher TXLS Trainee (shadowed a Lesson Study facilitator as they met with other groups)
4. Have you participated in Texas Lesson Study previously?
    a. Yes
    b. No

4b. If yes, how many TXLS cycles have you completed?

4c. If yes, describe in detail how your experience this semester compares to previous semesters.

5. Which part of the Lesson Study process did you find the most beneficial? Why?
    a. Phase 1 Examine and Identify: Create a research theme, examine the TEKS, STAAR data, scope and sequence, etc., and identify a standard(s) from the TEKS.
    b. Phase 2 Review and Plan: Review instructional materials and research articles/books and plan the lesson.
    c. Phase 3 Teach and Observe: Teach the lesson while observers collect data on student learning.
    d. Phase 4 Reflect and Revise: Debrief with the Lesson Observation group and possibly make revisions to the lesson.
    e. Phase 5 Share and Network: Share the lesson and findings with colleagues and on the Texas Gateway.
6. Which part of the Lesson Study process did you find the most challenging? Why?
    a. Phase 1 Examine and Identify: Create a research theme, examine the TEKS, STAAR data, scope and sequence, etc., and identify a standard(s) from the TEKS.
    b. Phase 2 Review and Plan: Review instructional materials and research articles/books and plan the lesson.
    c. Phase 3 Teach and Observe: Teach the lesson while observers collect data on student learning.
    d. Phase 4 Reflect and Revise: Debrief with the Lesson Observation group and possibly make revisions to the lesson.

    e. Phase 5 Share and Network: Share the lesson and findings with colleagues and on the Texas Gateway.
7. Participating in Lesson Study has impacted student growth. (Strongly Disagree to Strongly Agree)
8. Participating in Lesson Study has impacted my professional growth. (Strongly Disagree to Strongly Agree)
9. What changes to the Lesson Study program would you recommend?
10. Did you have sufficient time to go through the Lesson Study process? (Yes, No, Maybe)
11. Which section of the Lesson Proposal was the most beneficial in your teaching practice? Why?
    a. TEKS Vertical Alignment
    b. Research Theme and Goals
    c. Background and Rationale
    d. Research
    e. Assessment
    f. Unit Timeline
    g. Research Lesson
    h. Observation Focus
    i. Reflect and Revise
    j. Additional Recommendations and Next Steps
12. By having teachers and outside educators collect data during the Lesson Observation, I had greater insight on the learning process and students' understanding of the objective(s). (Strongly Disagree to Strongly Agree)
13. I would like to go through the Lesson Study process again. (Strongly Disagree to Strongly Agree)
14. Would you participate in Texas Lesson Study without a stipend?
    a. Yes
    b. No
    c. Maybe
15. Other comments, questions, or concerns

4. Principal End-of-Cycle Survey via Survey Monkey

Thank you for participating in the Texas Lesson Study Pilot Program. The Texas Education Agency and regional service center ask that you complete this survey to give feedback on your experience with Texas Lesson Study.

1. Survey completer contact information:
    a. Name
    b. Email Address
    c. School Campus Name
    d. District Name
    e. ESC Region
2. How did participation in the Lesson Study process impact your teachers? (open ended)
3. What changes to the Lesson Study Program would you recommend? (open ended)
4. Were you able to sit in on any of the Lesson Study sessions? (Yes, No)
    a. If yes, how would you describe the discussions taking place? (open ended)
    b. The discussions in those meetings were more in depth than typical team discussions. (Likert scale: Strongly Disagree to Strongly Agree)
5. Lesson Study impacted student growth. (Likert scale: Strongly Disagree to Strongly Agree)
6. Lesson Study impacted teachers' professional growth. (Likert scale: Strongly Disagree to Strongly Agree)
7. Are you interested in implementing Lesson Study campus wide? Why or why not? (open ended)
8. Could you see Lesson Study as part of your campus-wide professional development program? Why or why not? (open ended)
9. The designed lesson is aligned to the T-TESS framework. (Likert scale: Strongly Disagree to Strongly Agree)
10. Other questions, comments, or concerns

5. Student Post-Lesson Survey (paper/pencil)

1. How well did you understand today's lesson?
    A. I understood the lesson and can successfully do the work on my own.
    B. I understood most of the lesson but might need more time on this.
    C. I am a little confused and would like to spend more time on this.
    D. I did not understand the lesson and need more help.
2. The work I did today was
    A. too hard.
    B. just right.
    C. too easy.
3. I enjoyed today's lesson.
    A. Strongly agree (I <u>really</u> enjoyed the lesson.)
    B. Agree (I enjoyed the lesson.)
    C. Neutral (The lesson was ok.)
    D. Disagree (I did not like the lesson.)
    E. Strongly disagree (I <u>really</u> did not like the lesson.)
4. Today's lesson seemed _____ what we normally do in class.
    A. same as
    B. different than

6. Student Interview (in-person)

Student's achievement level (circle one): Below Grade Level At Grade Level Above Grade Level

1. What did you learn? What can you do now or better than before today's lesson?
2. What did you enjoy most about the lesson?
3. Which activities, ideas, or parts of the lesson helped you learn best?
4. If the same lesson is being taught to another class, what would you change? Why would you change that aspect?

APPENDIX B: Means of Post-Test Scores by Group

ESC	*N*	*Grade*	*Subject*	*M*
3	57	Primary	ELAR	92.98
3	126	Middle	Social Studies	83.64
3	23	Middle	ELAR	81.34
3	31	Middle	ELAR	98.07
3	15	Middle	ELAR	92.53
4	22	Intermediate	ELAR	78.18
4	28	Middle	Science	71.82
6	117	Intermediate	Science	92.84
6	36	Intermediate	Math	75.00
6	37	Middle	ELAR	77.00
6	28	High	Math	74.11
6	26	Intermediate	ELAR	90.38
6	34	Intermediate	Science	80.47
6	63	Middle	Social Studies	87.14
6	86	Primary	ELAR	85.24
6	35	Primary	ELAR	95.29
6	46	Middle	Science	85.57
6	37	Middle	Math	75.55
6	41	Primary	ELAR	84.07
6	22	Primary	ELAR	75.18
7	33	Middle	Science	86.06
7	24	Intermediate	ELAR	91.13
7	133	Primary	Math	83.23
7	29	Intermediate	ELAR	77.00
7	32	Primary	ELAR	81.63
7	45	Primary	ELAR	78.00
7	122	Middle	Science	83.20
7	101	Middle	Math	87.07
8	340	Middle	Math	78.93
8	268	Middle	Math	80.69

8	347	Intermediate	Math	66.39
8	365	Middle	Math	78.18
9	32	Primary	Math	73.00
9	36	Intermediate	Math	78.00
9	39	Primary	Math	92.23
9	36	Intermediate	Math	85.00
9	34	Primary	ELAR	72.00
9	36	Intermediate	Math	86.00
9	29	Intermediate	ELAR	80.00
10	67	Intermediate	ELAR	49.40
10	116	Middle	Social Studies	90.67
10	36	High	ELAR	65.00
10	49	Middle	ELAR	87.33
10	91	Intermediate	ELAR	80.00
10	53	High	ELAR	37.00
10	27	Middle	ELAR	61.11
10	20	Intermediate	ELAR	63.00
10	17	Intermediate	ELAR	48.00
10	38	Intermediate	ELAR	51.00
11	21	Middle	ELAR	87.00
11	69	Middle	ELAR	93.68
11	45	Intermediate	ELAR	71.00
11	42	Intermediate	ELAR	70.00
11	89	Intermediate	ELAR	79.00
11	70	Intermediate	ELAR	76.56
11	38	Intermediate	ELAR	74.00
11	103	Intermediate	ELAR	87.52
12	24	Intermediate	Math	39.00
12	21	Intermediate	Math	75.24
12	23	Intermediate	Math	48.00
12	23	Intermediate	Math	55.43
12	13	Intermediate	Math	50.77
12	22	Primary	Math	78.53

12	26	Intermediate	ELAR	49.62
13	28	Intermediate	ELAR	86.50
13	14	Intermediate	Math	39.29
13	90	High	Math	34.99
13	156	Middle	Math	71.67
13	175	Middle	Math	67.43
13	38	Intermediate	ELAR	98.68
13	17	Intermediate	Math	72.47
13	53	Primary	ELAR	83.77
13	99	Primary	Math	92.81
13	58	Intermediate	Math	90.21
13	30	Primary	ELAR	77.50
13	67	Middle	Social Studies	82.00
13	33	High	ELAR	83.61
13	46	High	ELAR	73.74
13	92	Intermediate	Math	71.00
13	124	Middle	Science	87.10
13	14	Middle	ELAR	77.00
13	51	Middle	ELAR	79.00
13	128	Intermediate	Math	72.50
13	124	Intermediate	Math	53.63
13	96	Primary	Math	93.00
13	42	Primary	ELAR	87.00
13	40	Primary	ELAR	96.00
13	35	Intermediate	Science	89.14
13	180	Middle	Science	91.20
13	33	Primary	ELAR	98.13
13	19	Intermediate	ELAR	96.53
13	71	Intermediate	Math	67.00
13	59	Intermediate	ELAR	72.40
13	63	Middle	Math	69.05
13	40	High	ELAR	78.75
13	167	High	ELAR	75.50

13	21	Intermediate	Math	82.86
13	31	Intermediate	ELAR	82.58
13	15	Intermediate	ELAR	70.67
13	57	Intermediate	ELAR	40.80
13	55	Intermediate	Math	83.00
13	56	Primary	ELAR	81.86
13	51	Intermediate	Math	80.00
14	37	Middle	ELAR	64.49
14	34	Intermediate	ELAR	76.00
14	42	Middle	ELAR	32.38
14	38	Primary	Math	72.11
14	29	Intermediate	ELAR	79.00
14	16	Middle	Technology	77.50
14	27	Intermediate	Science	78.52
14	28	Primary	ELAR	82.25
14	27	Primary	Math	76.45
14	22	Primary	ELAR	95.45
14	75	Middle	Science	91.73
14	30	Intermediate	ELAR	71.03
14	31	Primary	Science	95.48
14	30	Primary	ELAR	89.72
14	14	Intermediate	ELAR	85.71
14	9	Intermediate	Social Studies	82.2
14	11	Middle	ELAR	81.09
14	12	Middle	ELAR	73.33
14	9	High	ELAR	68.89
14	33	Intermediate	ELAR	45.91
14	22	High	ELAR	77.50
14	38	Middle	Math	61.00
14	24	Intermediate	Science	71.17
14	76	Intermediate	ELAR	80.00
14	72	Intermediate	Math	83.97
15	7	Middle	Science	49.00

15	8	High	Math	94.00
15	17	Middle	Math	74.71
15	22	Intermediate	Math	73.00
16	29	Primary	Math	82.70
16	31	Primary	Math	72.03
16	32	Intermediate	Math	75.00
16	52	Intermediate	Science	90.77
16	29	Middle	ELAR	82.76
16	33	Middle	Math	82.42
17	179	High	ELAR	59.00
17	43	High	Math	66.00
17	29	High	Science	62.00
17	19	High	Social Studies	53.00
17	28	Primary	ELAR	93.00
17	26	Primary	ELAR	66.15
17	74	Intermediate	ELAR	64.00
17	37	Intermediate	ELAR	51.00
17	79	Primary	ELAR	75.62
17	24	Primary	ELAR	60.00
17	30	Primary	ELAR	86.20
20	37	Primary	ELAR	89.86
20	28	Intermediate	ELAR	89.29
20	28	Intermediate	ELAR	86.75
20	30	Primary	ELAR	89.33
20	37	Intermediate	ELAR	85.27
20	20	Intermediate	Social Studies	90.85
20	14	Intermediate	ELAR	92.50
20	16	Primary	ELAR	90.00
20	32	Middle	Social Studies	94.00
20	24	Primary	Math	88.70
20	18	Primary	ELAR	63.89
20	26	Primary	ELAR	98.65
20	29	Primary	ELAR	93.27

20	28	Primary	ELAR	77.04
Total	**8,683**		**Mean**	**76.98**

APPENDIX C: Participating Districts and Campuses by ESC Region

ESC Region 3	
Eagle Lake Elementary	Rice Consolidated ISD
Eagle Lake Primary	Rice Consolidated ISD
Blessing Elementary	Tidehaven ISD
Herman Middle School	Van Vleck ISD
Hopkins Elementary	Victoria ISD
Stroman Middle School	Victoria ISD
Sivells Elementary	Wharton ISD
ESC Region 4	
Southside Primary School	Cleveland ISD
Hempstead Elementary School	Hempstead ISD
Hempstead Middle School	Hempstead ISD
Hempstead High School	Hempstead ISD
Taylor High School	Katy ISD
West Memorial Junior High School	Katy ISD
ESC Region 5	
Helena Park Elementary	Nederland ISD
Hillcrest Elementary	Nederland ISD
C.O. Wilson Middle School	Nederland ISD
Central Middle School	Nederland ISD
Ridgewood Elementary	Port Neches Groves ISD
Port Neches High School	Port Neches Groves ISD
ESC Region 6*	
Forest Ridge Elementary	College Station ISD
Spring Creek Elementary	College Station ISD
Madisonville Intermediate	Madisonville CISD
Magnolia Parkway Elementary	Magnolia ISD
Bear Branch Junior High School	Magnolia ISD
Onalaska Elementary	Onalaska ISD
Onalaska JR/SR High School	Onalaska ISD
Splendora Peach Creek Elementary	Splendora ISD
A.R. Turner Elementary	Willis ISD
Brabham Middle School	Willis ISD
Willis High School	Willis ISD
ESC Region 7	

Carlisle Schools	Carlisle ISD
Bruce Junior High School	Gilmer ISD
Gilmer Elementary	Gilmer ISD
Kilgore Middle School	Kilgore ISD
Tool Elementary	Malakoff ISD
ESC Region 8	
Mount Pleasant Junior High School	Mount Pleasant ISD
P. E. Wallace Middle School	Mount Pleasant ISD
ESC Region 9	
Holliday Elementary	Holliday ISD
Fowler Elementary	Wichita Falls ISD
Jefferson Elementary	Wichita Falls ISD
Kate Burgess Elementary	Wichita Falls ISD
ESC Region 10*	
Lake Ridge Elementary	Cedar Hill ISD
Cedar Hill High School	Cedar Hill ISD
Crandall Middle School	Crandall ISD
McDonald Elementary	Ferris ISD
Ferris Intermediate School	Ferris ISD
Ferris Junior High School	Ferris ISD
Ferris High School	Ferris ISD
Elsie Robertson Middle School	Lancaster ISD
ESC Region 11	
Boyd Intermediate School	Boyd ISD
Boyd Middle School	Boyd ISD
Pecan Creek Elementary School	Denton ISD
Hodge Elementary School	Denton ISD
ESC Region 12	
Southwest Elementary	Belton ISD
Marlin Elementary School	Marlin ISD
Lake Air Montessori	Waco ISD
ESC Region 13*	
Menchaca Elementary	Austin ISD
John H. Reagan Early College High School	Austin ISD
Fredericksburg Primary School	Fredericksburg ISD
Fredericksburg Elementary	Fredericksburg ISD
Fredericksburg Middle School	Fredericksburg ISD
Frost Elementary	Georgetown ISD
Mitchell Elementary	Georgetown ISD
Carpenter Hill Elementary	Hays ISD

Pleasant Hill Elementary	Leander ISD
River Ridge Elementary	Leander ISD
Naumann Elementary	Leander ISD
Deer Creek Elementary	Leander ISD
Bagdad Elementary	Leander ISD
Rutledge Elementary	Leander ISD
Cedar Park High School	Leander ISD
Lockhart Junior High School	Lockhart ISD
Northwest Elementary	Pflugerville ISD
Pflugerville Elementary	Pflugerville ISD
Dearing Elementary	Pflugerville ISD
Laurel Mountain Elementary	Round Rock ISD
ESC Region 14*	
Dyess Elementary	Abilene ISD
Clack Abilene High School	Abilene ISD
Clyde Elementary	Clyde ISD
Clyde Intermediate	Clyde ISD
Clyde Junior High School	Clyde ISD
DeLeon Elementary	DeLeon ISD
DeLeon Middle School	DeLeon ISD
Siebert Elementary	Eastland ISD
Eastland Middle School	Eastland ISD
Eastland High School	Eastland ISD
Hawley Elementary	Hawley ISD
Hawley High School	Hawley ISD
Roscoe Elementary	Roscoe ISD
Snyder Junior High School	Snyder ISD
ESC Region 15	
Bronte High School	Bronte ISD
Richland Springs School	Richland Springs ISD
Rochelle School	Rochelle ISD
Santa Anna High School	Santa Anna
ESC Region 16	
Sleepy Hollow Elementary	Amarillo ISD
Carver Early Childhood Academy	Amarillo ISD
Wolflin Elementary	Amarillo ISD
Windsor Elementary	Amarillo ISD
River Road Middle School	River Road ISD
ESC Region 17	
North Elementary	Lubbock-Cooper ISD

Central Elementary	Lubbock-Cooper ISD
Slaton High School	Slaton ISD
ESC Region 20	
Harmony Elementary	East Central ISD
Floresville Middle School	Floresville ISD
Floresville High School	Floresville ISD
Passmore Elementary	Northside ISD
Scobee Elementary	Northside ISD
Pleasanton Primary	Pleasanton ISD
Pleasanton High School	Pleasanton ISD
Huppertz Elementary	San Antonio ISD

* Indicates ESC Regional Hub

- ESC 6 Regional Hub: ESCs 4, 5, 6, 7
- ESC 10 Regional Hub: ESCs 8, 10, 11, 12
- ESC 13 Regional Hub: ESCs 3, 13, 20
- ESC 14 Regional Hub: ESCs 9, 14, 15, 16, 17