



Texas Lesson Study Report on Effectiveness: Spring 2017

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EVALUATOR INFORMATION

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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, set forth by Texas Commissioner of Education Mike Morath. 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 understanding. 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) contracted with three education service centers (ESCs) during the 2016–2017 school year to pilot Lesson Study (ESC 6, ESC 13, and ESC 14). Lesson Study was conducted as part of two pilots, one in fall 2016 and another in spring 2017. Data from both pilots were collected in the form of surveys, in-person interviews, and locally-designed assessments. This report examined the data collected from spring 2017, specifically focusing on changes to teacher self-efficacy, student performance on assessments, and the perceptions of Lesson Study facilitators, teachers, administrators and students about the effectiveness of the pilot.

Summary of Key Findings

The spring 2017 pilot included 118¹ teachers from 25 schools and 15 school districts. Teachers were combined into 1 of 32 Lesson Study groups². The lessons created by the groups were then delivered to 2,003 students across grades K–11, although teachers from the pilot instructed a total of 5,868 students during spring 2017. Some of these students may have received the lessons at a later point in time. Seventy-eight percent (78.0%) of the Lesson Study groups focused their instruction on either English language arts and reading (ELA/Reading) or mathematics. This focus was greater on mathematics in spring 2017 ($N = 18$) where as more groups focused on ELA/Reading in fall 2016 ($N = 14$).

Teachers who participated in the Lesson Study reported statistically higher levels of (a) confidence about their teaching ability and (b) feelings about being an expert in the content area they taught ($p < .05$)³.

¹ This value includes nine instructional coaches and/or content specialists who participated with teachers.

² One Lesson Study group dropped out of the pilot due to an illness of one of the participants.

³ Although stricter criteria may be established, a 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).

These gains were considered to be moderate to large⁴ 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.

Teachers were also asked about which phases and components of the lesson study they saw as most beneficial. A greater number of teachers reported the revision and reflection phase to be the most beneficial phase of Lesson Study ($N = 28$). Many teachers commented that Lesson Study provided time for planning and reflection not usually available to them during the school day. Lesson planning was frequently reported to be the most beneficial section for teaching practice ($N = 25$). Collaboration with other teachers helped them to consider various teaching styles and pedagogical practices. 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.

In addition to the professional growth of teachers, 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 and the magnitude of the gains on the assessments was approximately 16 percentage points. Students reported that they understood most or all of the lessons (88.9%) and enjoyed them (63.4%). Students further reported that the utilization of group work incorporated by the lessons was the activity they enjoyed most and the activity that helped them to learn best.

Collectively, the evidence suggested that Lesson Study had value for both teachers and students. The report offers recommendations to help guide program managers and the program director as they continue to implement Lesson Study Professional Development program across the State of Texas.

⁴ 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.

INTRODUCTION

The Texas Education Agency (TEA) began a pilot of the Lesson Study Professional Development program in the fall of 2016. 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 Studies are shared with teachers across the state on the Texas Gateway (formerly known as Project Share) website. This report details findings from the spring 2017 pilot of the Lesson Study Professional Development program.

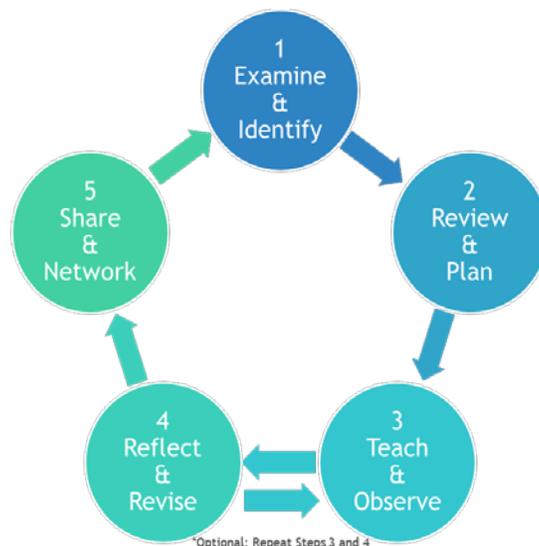
Overview of Lesson Study

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 utilization 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 two to five 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.



Purpose and Goal of Lesson Study

The Texas Education Agency contracted with Education Service Center (ESC) Regions 6, 13, and 14 to pilot 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 Pilot program affect teacher's 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 perceptions of students about the lessons developed through the Lesson Study process?

METHOD

Data Collection

Data was collected from ESC facilitators, teachers, administrators, and students throughout the Lesson Study cycle. 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 of the Lesson Study after each phase of the process. 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 a pre-test and post-test assessment to evaluate what they learned from the research-based lesson. Teachers developed the student assessments 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 B.

Participating Schools

The coordinating ESCs for the three pilots were ESC 6, ESC 13, and ESC 14. Education Service Center 6 partnered with ESC 5. Education Service Center 14 partnered with ESC 15 and ESC 16. Collectively, 30⁵ schools from 16 school districts across the state participated in the professional development program. A list of all participating schools by school district and ESC is provided in Table 1.

⁵ This number reflects the total number of participating schools across both pilot semesters. Not all schools participated in both the fall and spring pilots.

Table 1. Participating Schools and School Districts by Education Service Center

Education Service Center 5	
Groves Elementary	Port Neches-Groves ISD
Ridgewood Elementary	Port Neches-Groves ISD
Education Service Center 6*	
Bear Branch Junior High	Magnolia ISD
Magnolia Parkway Elementary	Magnolia ISD
Onalaska Elementary	Onalaska ISD
Onalaska JR/SR High	Onalaska ISD
Madisonville Intermediate School	Madisonville ISD
Madisonville Junior High	Madisonville ISD
Forest Ridge Elementary	College Station ISD
Spring Creek Elementary	College Station ISD
Education Service Center 13*	
Hutto Middle School	Hutto ISD
Cedar Park Middle School ^b	Leander ISD
Leander Middle School	Leander ISD
Regan Elementary	Leander ISD
Vista Ridge High School	Leander ISD
Bill Burden Elementary	Liberty Hill ISD
Liberty Hill Elementary ^a	Liberty Hill ISD
Liberty Hill Intermediate ^b	Liberty Hill ISD
Ojeda Middle School ^a	De Valle ISD
Teravista Elementary ^a	Round Rock ISD
Education Service Center 14*	
Academy of Technology, Engineering, Mathematics, and Science ^a	Abilene ISD
Craig Middle School ^a	Abilene ISD
Dyess Elementary	Abilene ISD
Eula Elementary ^b	Eula ISD
Hawley Elementary ^b	Hawley ISD
Hawley Middle School ^a	Hawley ISD
Education Service Center 15	
Glenn Middle School	San Angelo ISD
San Saba Elementary	San Saba ISD
Education Service Center 16	
Lorenzo de Zavala Middle School	Amarillo ISD
Carver Elementary Academy	Amarillo ISD

* Reflects the ESC coordinating the pilot.

^a These schools participated in the Lesson Study during fall 2016 only.

^b The schools participated in the Lesson Study during spring 2017 only.

Demographic characteristics of participating schools are reported in Table 2. Participating schools varied in size. The schools also represented a variety of rural, town, suburban, and city locations. Schools from city or urban areas represented 31 percent (30.8%) of those participating in the Lesson Study. Thirty-one percent (30.6%) of schools served a student population where at least 50 percent of students were economically disadvantaged.

Table 2. Demographic Characteristics of All Participating Pilot Schools (N = 30)

Characteristic	N	%
Student Enrollment		
0–250	2	6.7
251–500	11	36.7
501–750	8	26.7
751–1,000	6	20.0
1,001 +	3	10.0
Locale Category		
Rural	9	30.0
Town	5	16.7
Suburb	8	26.7
City	8	26.7
% Economically Disadvantaged		
0–25%	8	26.7
26–50%	12	40.0
51–75%	7	23.3
76–100%	3	10.0

Note: Demographic information is based on data available from SY 2014–15.

The total number of teachers who participated in the Lesson Study pilot was 238⁶. Of these, 120 participated in the fall pilot and 118 participated in the spring pilot. Fourteen percent (13.9%) of spring 2017 pilot participants also participated in the fall pilot. Most of the spring 2017 pilot participants identified themselves as a teacher lead or participating teacher with an ESC facilitator (91.4%). The remaining participants (8.6%) identified as an instructional coach⁷.

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 met weekly with participants in each group between the months of September to November 2016 for the fall pilot and between the months of January and April 2017 for the spring pilot.

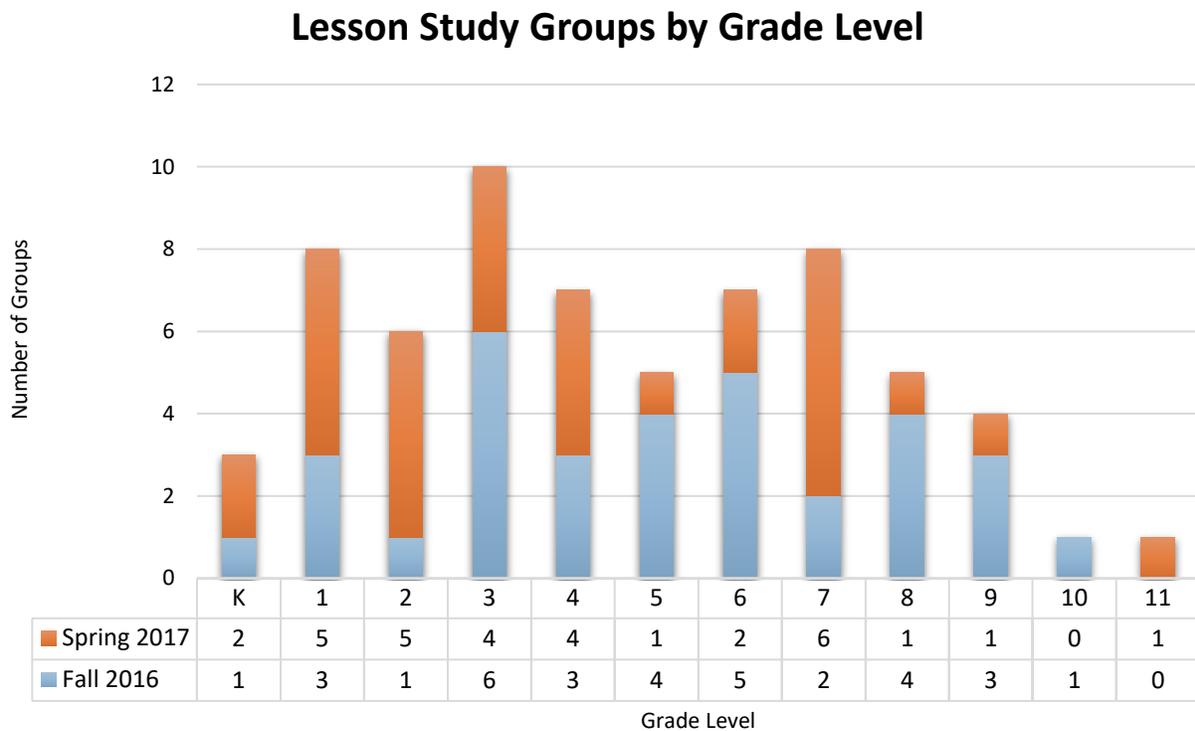
⁶ This value includes 15 instructional coaches and/or content specialists who participated with teachers.

⁷ The percentage of teachers and instructional coaches was obtained from responses to the Teacher Participant post-survey.

Groups identified a target grade level, subject area, and TEKS for the Lesson Study, although the construct of the Lesson Study groups varied based on the campus size and needs. For example, groups comprised of teachers that taught the same subject, grade level, or sometimes a combination of the two (e.g., a group of 3rd grade math teachers, a group of 6th, 7th, and 8th grade Science teachers, a group with U.S. History and English 1 teachers creating an interdisciplinary lesson). A list of TEKS identified by the Lesson Study groups may be found in Appendix A.

The number of Lesson Study groups are reported by grade level in Figure 2. Groups created lessons for grade levels ranging from Kindergarten to Grade 11. More groups created lessons for Grade 7 during the spring 2017 pilot, although Grade 3 was the level most targeted when examined across both pilot semesters. In some instances, teachers within a group targeted more than one grade level for the Lesson Study. Five groups reported collaboratively working across grade levels in the spring 2017 pilot. These groups typically targeted the Lesson Study to Grades 4–5 or Grades 6–8.

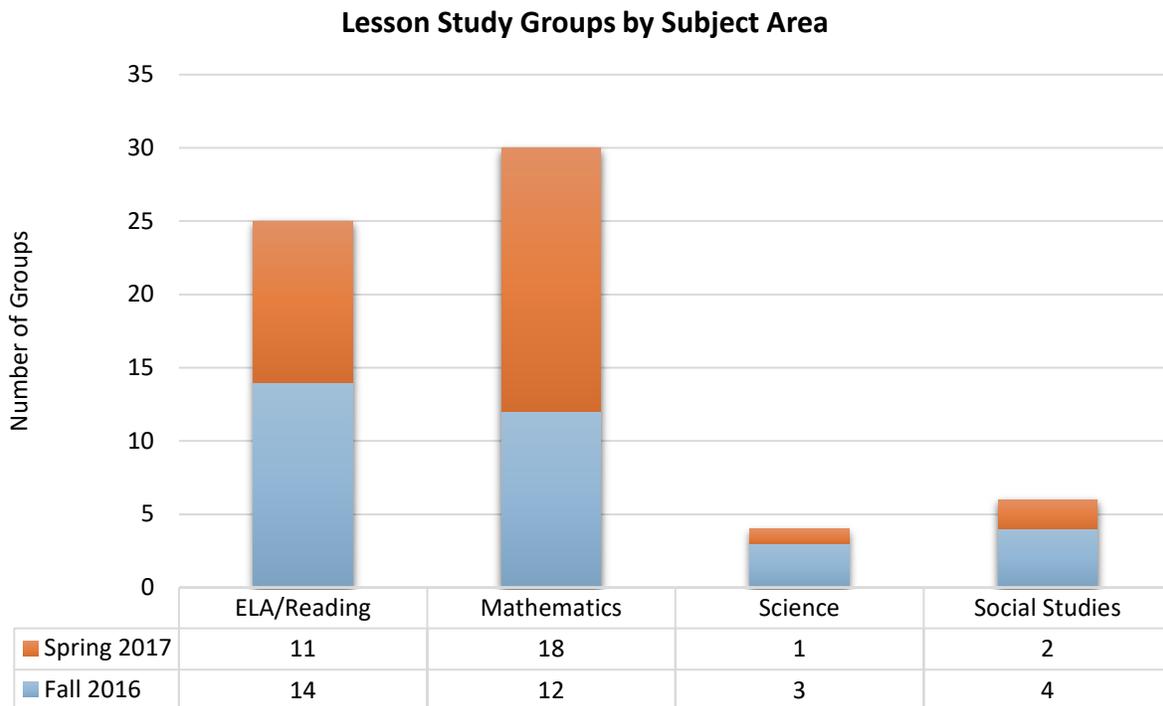
Figure 2. Number of Lesson Study Pilot Groups by Grade Level and Pilot Semester



Note: The total number of Lesson Study groups in the fall was 33. The total number of Lesson Study groups in the spring was 32.

The number of Lesson Study groups is reported by subject area in Figure 3. Most groups focused the Lesson Study on either mathematics or English language arts and reading (ELA/Reading). A greater number of groups focused on ELA/Reading during the fall 2016 pilot ($N = 14$) whereas more groups focused on mathematics during the spring 2017 pilot ($N = 18$).

Figure 3. Number of Lesson Study Groups by Subject Area and Pilot Semester



RESULTS

Q1. How did the Lesson Study Professional Development Pilot program affect teacher's sense of self-efficacy?

A pre-test and post-test survey of teacher self-efficacy (Appendix B) was distributed to all participants during the Lesson Study pilot. The survey was developed by program managers from each of the coordinating ESCs (i.e. ESC 6, ESC 13, and ESC 14) and the TEA project director. The number of participants that completed the pre-test survey during the spring 2017 pilot was 91 (83% response rate). The internal consistency of scores from the pre-test survey was $\alpha = .71$ ⁸. The number of teachers that completed a post-test survey was 72 (66 % response rate). The internal consistency of scores from the post-test survey was $\alpha = .70$. The results of the pre-test and post-test surveys are reported in Table 3.

Teacher participant responses varied between 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 ($\alpha = .05$). Data were collected anonymously so the data were compared using computed means and standard deviations. The results of the *t*-tests indicated that the scores of four survey items were statistically different from pre-test to post-test. Teachers reported gains in (a) the time they received to collaborate with colleagues, (b) feelings of expertise in the content area taught, and (c) viewing their colleagues as experts. The greatest gains were found in teachers' confidence in their teaching ability. Participants in the Lesson Study pilot showed nearly a full standard deviation increase over their pre-test scores ($d = 0.8$). This change was largely based on guidance in the literature for interpreting these coefficients⁹.

The results from the spring 2017 pilot were then compared to results from the fall 2016 pilot. Teachers reported consistent gains in their (a) beliefs about their teaching abilities and (b) viewing themselves as experts in the content taught to students. One difference between the results of the two pilots was that there were no statistical declines reported by participants during spring 2017. Additionally, teachers reported gains to some survey items in spring 2017 that were not reported the previous semester (i.e., more time to collaborate with others, viewing their colleagues as experts). This seemed to suggest that the changes made to the program between the pilot semesters were beneficial.

⁸ Alpha (α) is a measure of internal consistency, which refers to how consistent the items on a test measure a single construct or concepts.

⁹ Cohen (1992) was used as a general guide for the interpretation of standardized mean differences.

Table 3. Means, Standard Deviations, and Standardized Mean Differences of Teacher Self-Efficacy Scores

Teacher Self-Efficacy	Fall 2016 Pilot					Spring 2017 Pilot				
	Pre-Test (N = 156)		Post-Test (N = 84)		<i>d</i>	Pre-Test (N = 91)		Post-Test (N = 72)		<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
1. I am confident in my teaching abilities.	4.2	0.7	4.6	0.5	0.7*	4.2	0.7	4.7	0.5	0.8*
2. I would recommend the teaching profession to others.	3.7	1.0	3.5	0.9	-0.2	3.7	1.0	3.9	1.0	0.2
3. I receive adequate time to collaborate with my colleagues.	3.4	1.1	3.1	1.1	-0.3	3.2	1.3	3.6	1.3	0.3*
4. I am an expert in the content that I teach.	3.9	0.8	4.2	0.7	0.4*	3.8	0.8	4.2	0.7	0.5*
5. I am comfortable discussing my classroom with others.	4.7	0.6	4.8	0.4	0.2	4.7	0.5	4.8	0.4	-0.2
6. I feel like a respected professional.	4.1	0.9	3.8	1.0	-0.3*	4.1	0.9	4.2	0.8	0.1
7. I view my colleagues as experts in the field of teaching.	4.4	0.7	4.4	0.6	0.0	4.3	0.6	4.6	0.6	0.5*
8. Collaborative professional development positively impacts student learning.	4.7	0.6	4.6	0.5	0.0	4.7	0.6	4.7	0.5	0.0
Internal Consistency Reliability (α)	.72		.67			.71		.70		

Note: The wording in the items above have been modified slightly for space. Exact item wording can be found in the Appendix.

* 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 (Appendix). 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. These percentages generally improved by the end of the Lesson Study cycle.

Facilitator expectations from the spring 2017 pilot were also compared to those from fall 2016. Facilitators generally reported a higher percentage of participants met or exceeded expectations in spring 2017. Facilitators indicated that group members were more (a) prepared with materials, resources, and ideas, (b) more likely to share responsibilities, and (c) better understood the phases of the Lesson Study cycle. This seemed to indicate that adjustments made in between the two pilots helped to better prepare participants for the program.

Table 4. Percent of Facilitators Indicating Group Members Met or Exceeded Expectations (N = 32)

Facilitator Reflections about Group Members	Fall 2016 Pilot		Spring 2017 Pilot	
	% Initial Meeting	% Final Meeting	% Initial Meeting	% Final Meeting
Open and non-judgmental to other's opinions and ideas	97.0	100.0	97.0	100.0
Patient and flexible	97.0	96.9	93.9	100.0
Optimistic and enthusiastic	93.9	96.9	90.9	100.0
Prepared with materials, resources, and ideas	87.9	96.9	90.9	90.9
Share responsibility and follow through with their meeting 'roles'	97.0	96.9	93.9	95.5
Understand the phase of the Lesson Study cycle in which they are working	87.9	100.0	93.9	100.0
Listen to each other and ask questions	84.8	100.0	90.9	100.0
Contribute to the discussion	90.9	100.0	90.9	95.5
Stay on task	93.9	93.8	96.9	95.5

Note: The % reported in the final meeting of the spring 2017 is based on the responses from 22 facilitators. Not all facilitators completed surveys after the initial group meeting.

Facilitators were also invited to identify practices that assisted in the success of the Lesson Study process through an open-ended survey question. The themes that emerged from those comments are detailed in the following subsections of this report.

THE CHANGE TO A FULL DAY ORIENTATION IMPROVED THE LESSON STUDY PROCESS

Many facilitators commented that the change to a full day orientation during the spring 2017 pilot was an improvement to the Lesson Study process. It allowed them to begin working on the Lesson Study earlier and created more time for revision and reflection.

“The full day training really allowed us as a group to ask [the] questions needed to fully understand the process of Lesson Study.”

“The structure of this semester was much easier to handle. The teachers seemed to be more relaxed with the format we followed this semester.”

“I felt very rushed during the first semester, but with the extended time frame for this spring semester, I feel that we will be able to really get the lesson down and clean it up without any of the teachers feeling the need to go in and make any last minute changes. I feel ahead of the game right now, and hope that we get through the process without any problems.”

THE RESOURCES PROVIDED TO FACILITATE THE LESSON STUDY PROCESS WERE HELPFUL

The resources available to participants of the Lesson Study were generally well received and helped to facilitate discussion with other teacher participants. Facilitators consistently mentioned three resources. These resources included the textbook, Lesson Study proposal template, and the data dig tool.

“The new lesson proposal template is working really well.”

“The examples from the book...provided a foundation on which the teachers were immediately able to apply to their own situations.”

“It was helpful to have examples...to help the teachers better understand what was needed. Teachers were able to reflect on those examples and use them as a starting point in their own discussions and final products.”

“Using our data dig tool...as we dug through their data, they realized they not only didn’t understand the TEKS, but skipped teaching it.”

COLLABORATION FACILITATED REFLECTION

Facilitators often commented on the value of time for collaboration and how this positively impacted the reflection process for teacher participants. Further, facilitators commented that they preferred reflecting at the end of each phase, rather than after each meeting. This made the reflection process more meaningful.

“Allowing teachers to discuss their research, best practice, and application to the classroom was the most effective use of time together.”

“Collaboration and allowing time for feedback and listening to one another have all contributed to the success of this team’s work.”

“I like that we are reflecting after each completed Phase rather than after each meeting. This really gives us all time to digest what the process is, how we are accomplishing the tasks, and having rich discussions on our findings.”

Perceptions of Teachers

Teacher participants were invited to respond to a Teacher Reflection survey (Appendix B) given at the end of each phase of the Lesson Study and at the end of the Lesson Study cycle. As part of these surveys, teacher participants were asked to identify the components that were most beneficial and most challenging to them. These surveys were new to the evaluation in spring 2017. A summary of the teacher responses from each phase are provided below.

PHASE 1: EXAMINE & IDENTIFY

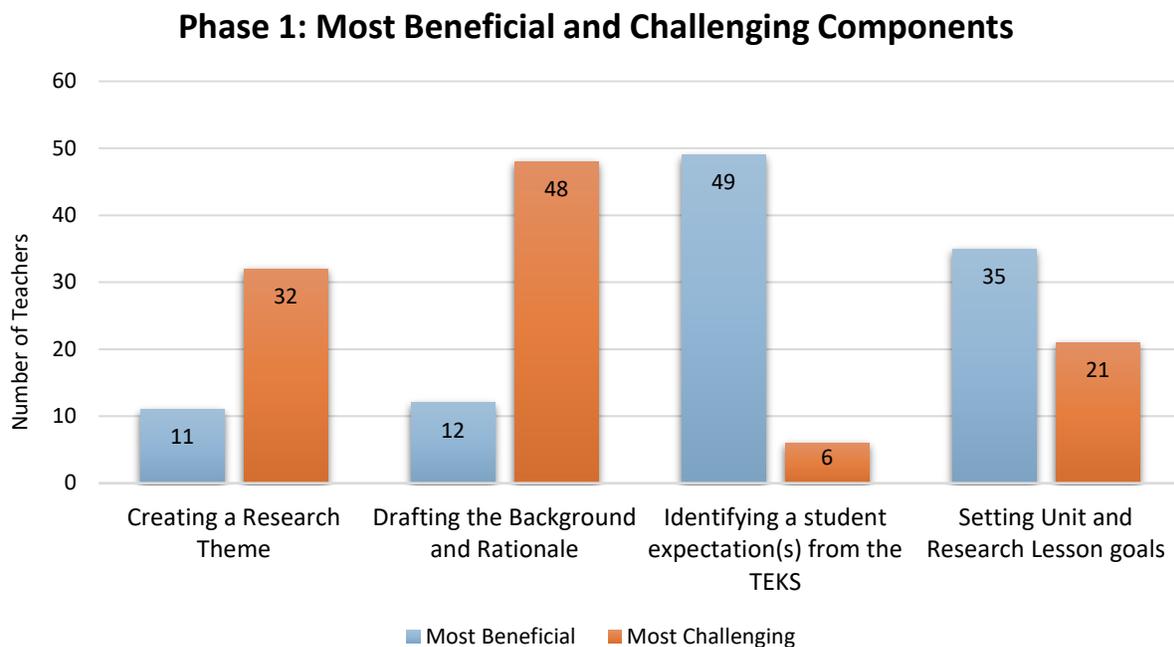
Of the 118 teacher participants, 107 responded to the Teacher Reflection survey at the end of Phase 1 (91% response rate). Teachers reported that identifying a student expectation from the TEKS ($N = 49$) and setting unit and research lesson goals ($N = 35$) were the most beneficial components of Phase 1 (Figure 4). A common theme among teachers was that these components helped to guide them through the Lesson Study process.

“Pinpointing specific needs to focus on helps us feel less overwhelmed and prioritize in our teaching.”

“Vertical knowledge of the TEKS is important to understand what students are supposed to come knowing/mastered to allow teachers to build on this knowledge.”

“Setting unit and research lesson goals enabled me to think more intentionally about the ways in which we will help students achieve these goals, which in turn led to more intentional planning of the unit/research lesson so that we could plan engaging and meaningful experiences for our students. This will have the best and longest-lasting effects on my teaching practice.”

Figure 4. The Most Beneficial and Challenging Components of Phase 1 ($N = 107$)



The most challenging components of Phase 1 were (a) creating a research theme and (b) drafting the background and rationale for the lesson. Many teachers suggested it was difficult to narrow down the lesson to just one area of focus and that this required a lot of time and reflection.

"I have never had to come up with or write a theme in the way the Lesson Study was asking, so as a team, we had to share and combine our ideas to create the theme."

"There are so many possibilities we can look at for research, it took a while to narrow it down to one focus."

"Drafting the background and rational can feel like an endless task. This portion of lesson planning needs continual revision, research, and discussion of our collaborative rationale."

PHASE 2: REVIEW & PLAN

Of the 118 teacher participants, 103 responded to the Teacher Reflection survey at the end of Phase 2. This resulted in an 87% response rate. Teachers reported that designing the research lesson was the most beneficial component of this phase (Figure 5). Many teachers commented that there was limited time for these activities during the typical workday. The ability to reflect on the design of the lesson allowed teachers to be more intentional in the way that lessons were delivered to students.

"The very little time we have is usually spent on "business" planning rather than getting to dive deep into what we teach and how we teach it."

"Designing the research lesson allowed me to be much more intentional about the ways in which I present information to students during lessons, as well as to monitor myself to make sure my teaching is not focused on me, the teacher, but rather the students."

"The in-depth planning of the lesson for Lesson Study prompted great discussion and helped me as a teacher to reflect on why the lesson is so important and the most effective means to help students succeed at this skill."

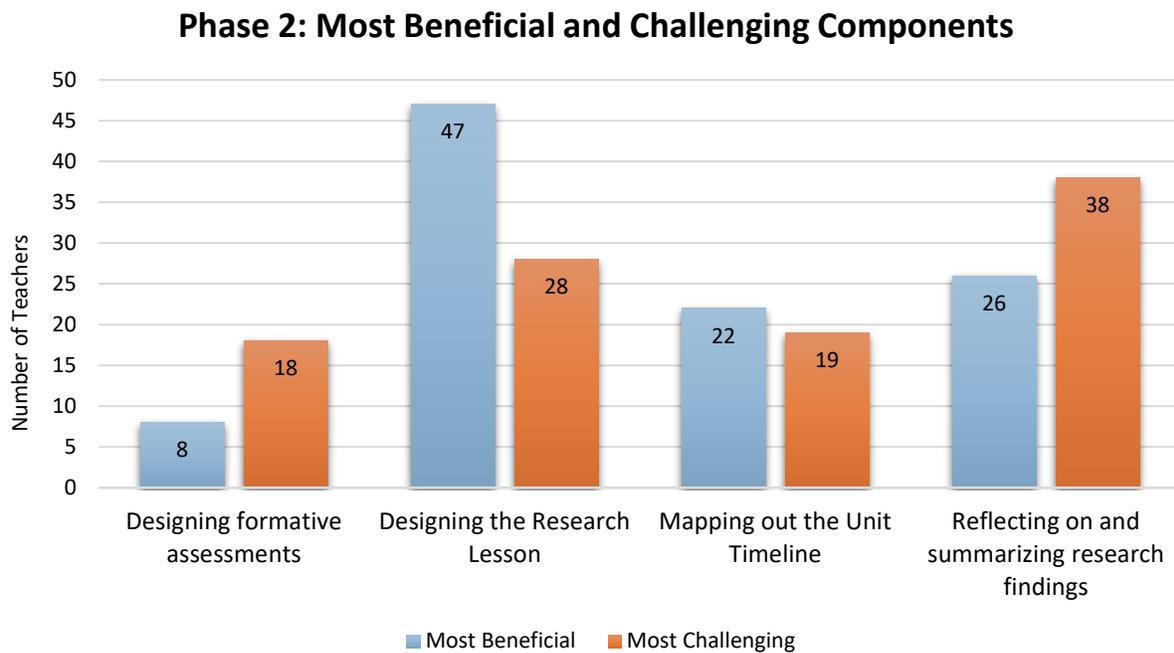
The most challenging component of Phase 2 was the process of reflecting on and summarizing the research findings. Many teachers reported that this was not a regular activity and it took more time to do as a result.

"Summarizing my findings is not something I do every day so it took me longer to put this piece together."

"It was difficult to summarize research findings and find non-contrived ways to include research in our Lesson Study rationale; we knew that the information from the articles was relevant to our Lesson Study, but it was difficult to find ways to naturally fit the information into our rationale."

"The research and discussion of our findings is such a powerful part to the process. However, the summarizing and citing of articles is not something we do daily so I found it most challenging."

Figure 5. The Most Beneficial and Challenging Components of Phase 2 (N = 103)



PHASES 3 & 4: TEACH, OBSERVE, REFLECT & REVISE

Of the 118 teacher participants, 83 responded to the Teacher Reflection survey at the end of Phase 4. This resulted in a 70% response rate. Teachers reported that reflecting on and discussing the research lesson was the most beneficial component of Phases 3 and 4 (Figure 6). Teachers commonly reported that this allowed them to identify what was not working well.

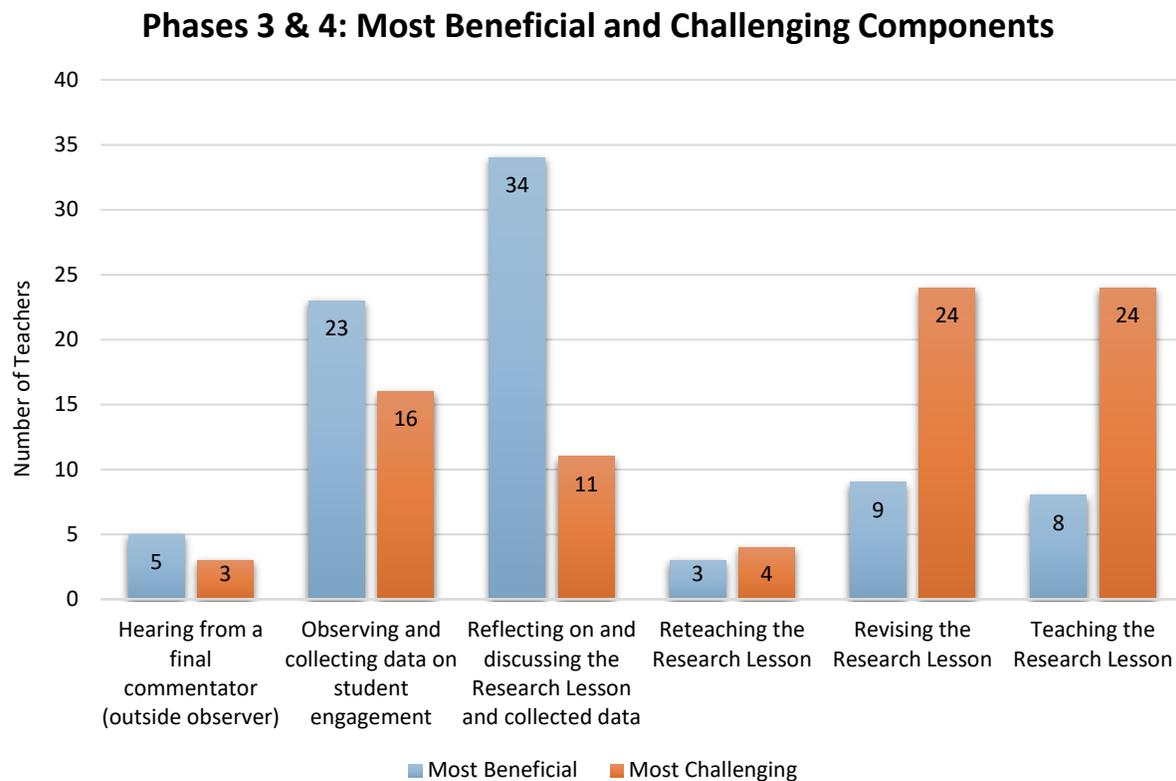
“Hearing the expected, unexpected, and next steps were important in making the necessary changes for the revised research lesson to be effective.”

“It gave us an opportunity to observe the lesson we had created being taught in addition to watching the student interactions. Some of the student responses were not what we had anticipated at all. That particular event was very powerful in helping us to see the lesson through the students’ eyes.”

“This allowed for the team to revise the lesson to develop a better lesson for the students. The second lesson went much better than the first because of this step.”

“This discussion gave us all a chance to collaborate on what went well and what needed to be changed. We had a rich discussion on many different aspects of the lesson from logistics to procedures to student grouping, student interactions, etc. The reflection piece along with the collaborative discussion really helped bring the lesson together and helped us all see the purpose in each step.”

Figure 6. The Most Beneficial and Challenging Components of Phases 3 and 4 (N = 83)



The most challenging components of Phases 3 and 4 were teaching and revising the research lesson. A number of teachers expressed anxiety about teaching in front of others and that the lessons were being recorded. Teachers also found the process of revising the lesson to be very involved and time consuming.

“Since we put so much effort into every detail of this lesson, when I taught it to my class I felt an added pressure to go off the script. When my students came up with different questions or issues, etc., I had to set the script aside and adjust while still trying to teach the lesson with integrity. The lesson had many different aspects to it, and juggling it all was a great learning experience.”

“Revising is challenging because there are so many more ideas after the fact that could work and limiting them was difficult.”

“We had to go back to our research and find information that supported our lesson. It really took a lot of digging and fine tuning.”

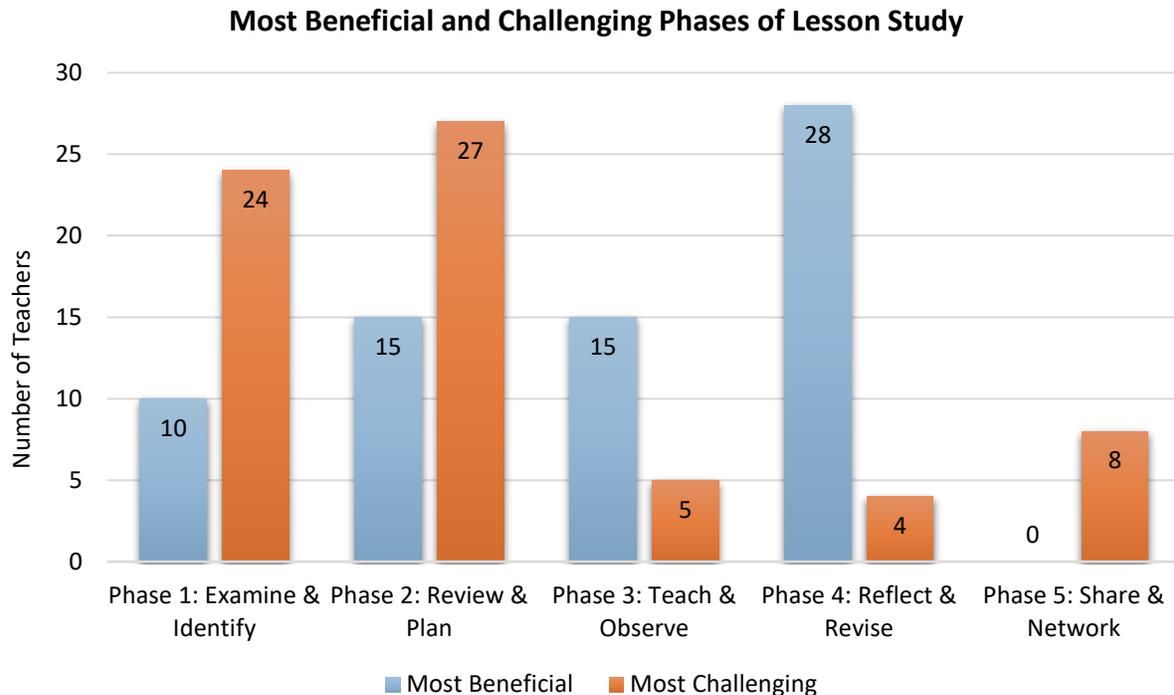
“This portion of the Lesson Study required analysis of data and a great deal of discussion to come to a consensus about what changes would have the most impact on student learning.”

OVERALL EVALUATION OF THE LESSON STUDY

Teacher participants were asked to identify which phase of the Lesson Study cycle they found to be most beneficial and most challenging to them. Of the 118 teacher participants, 70 responded to the end-of-cycle survey. This resulted in a 59% response rate. Of those that responded to the survey, Phase

4 (Reflect & Revise) was frequently reported to be the most beneficial phase of the Lesson Study process (Figure 7).

Figure 7. The Most Beneficial Phase of Lesson Study (N = 70)



When asked why this phase was most beneficial, teachers frequently commented on the value of time to plan and reflect. Many teachers mentioned that time for Lesson Study planning and revision was not available to them during a typical school day.

“The reflection and revising components of Lesson Study was beneficial to me because I got to see firsthand how people taught, reacted to student answers and used questioning strategies. I also got to see and hear many different approaches of how we could alter the lesson. This gives me ideas to bring back to my own classroom.”

“This is where the most growth is made.”

“Reflection is always a positive step in making lessons better for students and for teachers. This is what makes the lesson something that you would want to share with others/network.”

“The chance to put all of our heads together to discuss what worked and what needed to be changed immediately after teaching the lesson was very beneficial.”

“The feedback we received from the lesson has stuck with me. I think differently now, it has changed my teaching.”

The most challenging components of the Lesson Study were identifying a research theme and student expectation from the TEKS (Phase 1) and researching best practices for the identified student

expectation (Phase 2). Comments were made about the difficulty in finding directly applicable research. Although the literature may speak broadly about a topic, there were concerns about its applicability to the specific target population. For example, a research study on mathematics instruction at the middle school level may not be appropriate for students at the elementary level.

"Picking one topic or Student Expectation was not easy. Using our data was not difficult, but only picking one was the hard part."

"It was difficult to find quality research articles."

"The beginning was the most challenging. It was difficult because I didn't understand what the outcome would be."

"It was hard to find research in the particular lesson we were teaching."

"We knew the topic and standards we wanted right away, but coming up with a theme within that was difficult."

"It was hard to find some research for the grade level of students that we teach, for example Kindergarten."

Lastly, teachers were asked about which section of the Lesson Study proposal they viewed as most beneficial for their teaching practice. The most common response was planning the lesson (Figure 8). Participants responded that this section reflected their value of collaboration and that it created the space and time for planning. The existing planning period for teachers was not usually sufficient for this level of depth in the planning process.

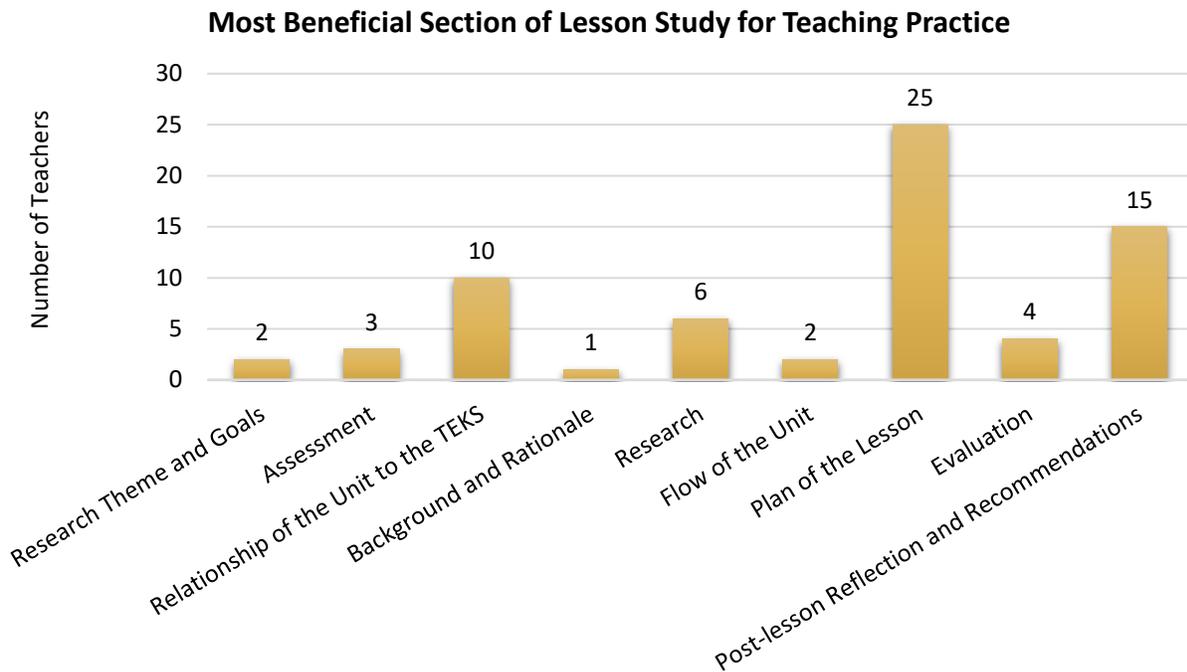
"I loved collaborating with my colleagues. We each have our own style of teaching. We got to combine all of our ideas into one amazing lesson!"

"Planning the lesson and thinking about the anticipated student responses was most beneficial because it took the focus of the lesson off of the teacher and shifted it to the students."

"Collaborating with the other teachers and talking about specific practices, questions, etc. was great. We try to do that in our PLC meetings, but 45 minutes 2X a week just isn't enough to really dive in."

"It makes you think how to best present a lesson to students. I know that my way of thinking has changed."

Figure 8. The Most Beneficial Section of Lesson Study Proposal for Teaching Practice (N = 70)



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 (78.2%) and their own professional growth (84.3%). Further, most teachers reported that the process of collecting data during the lesson observation provided insight into the learning process (87.2%). These findings were consistent across both pilot semesters.

Table 5. Percent of Teachers Who Responded Favorably to Questions about Student and Professional Growth (N = 70)

Question	Fall 2016 %	Spring 2017 %
Did you have sufficient time to go through the Lesson Study process?	--	78.6
Participating in Lesson Study has impacted student growth.	77.8	78.2
Participation in Lesson Study has impacted my professional growth.	82.2	84.3
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).	80.0	87.2

CONTINUED LESSON STUDY AND STIPENDS

The percent of teachers who responded favorably to repeating the Lesson Study process and without a stipend is reported in Table 6. Approximately half of the teachers participating in the Lesson Study pilot

reported that they would be willing to participate in Lesson Study again (47.2%). Only 17 percent of teachers would participate in the Lesson Study without receiving a stipend. Again, these results were consistent across the pilot semesters.

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

Question	Fall 2016 %	Spring 2017 %
I would like to go through the Lesson Study process again.	51.1	47.2
Would you participate in Lesson Study again without receiving a stipend?	12.2	17.1

Perceptions of School Administrators

At least one administrator from each of the 25 schools that participated in the Lesson Study during the spring 2017 pilot were asked to complete a survey about the professional development program (Appendix B). Fifteen schools completed an administrator survey (50% response rate). Most school administrators observed at least some part of the Lesson Study discussions during the spring 2017 pilot (86.6%). Teacher conversations were often described using words such as “professional,” “meaningful,” “rich,” “focused,” and “honest”.

“High level discussions with honest reflection and a mind set for growth and improvement.”

“The discussions were honest and filled with great ideas for understanding the content and making improvements in teaching. The convergence of “great minds” led to exciting ways to present material that is sometimes difficult to teach and difficult for students to understand.”

The percent of administrators that responded favorably to survey items are reported in Table 7. Most administrators indicated that Lesson Study impacted both students’ (86.6%) and teachers’ professional growth (93.3%). These responses were slightly higher than what was reported by administrators during the fall 2016 pilot. Most administrators (93.3%) 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 = 15)

Question	Fall 2016 %	Spring 2016 %
Lesson Study impacted student growth	77.8	86.6
Lesson Study impacted teachers professional growth	88.9	93.3
The designed lesson is aligned to the T-TESS framework	100.0	93.3

When asked how the Lesson Study impacted teachers, many administrators commented that Lesson Study helped participants learn how data can be used to help inform their instruction. Many administrators also commented on the importance and value of collaboration.

“Lesson Study caused them to reflect on the art of lesson planning and different methods of delivery. They were already a tight group, but this process makes them even closer as colleagues.”

“Teachers developed a deeper understanding of the TEKS that was selected for study. The lesson developed and refined will be a valuable part of their teaching portfolio in future years.”

“It was a growth experience in how we as educators can target specific areas of the curriculum to research an area of need and develop a lesson to help create a change in more effectively delivering a lesson to improve student performance.”

“The discussions we had throughout the lesson plan study were very impressive and at a level that I have not reached before with my teachers. After the lesson plan study, I saw even more change in how they thought about lesson presentation, student learning, etc. I saw a different level of professionalism among all of my teachers that participated.”

School administrators were also asked about what changes they would recommend for the Lesson Study Professional Development program. Several administrators suggested that the changes made between the fall 2016 and spring 2017 pilots were beneficial and they believed those changes helped to make the program run more smoothly. There were also some suggestions that staff continue to improve communication between the ESC personnel and participating schools. There were some questions about required paperwork and deadlines. Other recommendations from school administrators included exploring the summer for Lesson Study and working to shorten the time commitment for participants.

“I feel that changing to the summer training model will help teachers prepare better and reduce the stress of the school year.”

“More communication from the facilitator to the administrator and teachers regarding paperwork deadlines.”

“Addition of guiding or leading questions to help groups when they get stuck on ideas.”

SCHOOL ADMINISTRATOR INTEREST IN FUTURE LESSON STUDIES

School administrators were asked about their interest in implementing Lesson Study campus-wide and their willingness to adjust the school day schedule to accommodate Lesson Study meetings (Table 8). Only 40 percent of school administrators reported that they were willing to implement Lesson Study campus-wide, although this was higher than the percentage of school administrators who responded favorably following the fall 2016 pilot. Whereas the availability of time was the primary concern in the fall, school administrators were more likely to express concern over the level of support that would be needed to implement Lesson Study campus-wide. It was suggested that targeting one grade or a specific area of need on a campus would be a more feasible approach. Only 20 percent of school administrators were willing to adjust the school day schedule. The primary concerns raised by school administrators were the level of commitment required to implement the program on campus and the appropriateness of adjusting the schedule for staff rather than for students.

Table 8. Percent of School Administrators Who Responded “Yes” to Questions about Lesson Study in the Future

Question	Fall 2016	Spring 2017
	%	%
Are you interested in implementing Lesson Study campus wide?	22.2	40.0
Would you be willing to adjust the school day schedule next year to build in time for Lesson Study meetings?	25.9	20.0

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

Student Participants by ESC Pilot Group

The number of students that directly participated in one of the lessons as part of the spring 2017 pilot was 2,003. This represented a 59.0 percent increase over the number of students that participated during fall 2016. However, teachers from the spring 2017 pilot instructed a total of 5,868 students and some of these students also received the lessons at a later point in time.

The number and percent of student participants during the spring 2017 pilot are reported by ESC group in Table 9. The largest number of student participants was reported by the ESC 6 group ($N = 928$). The other two ESC groups served about the same number of students across both semesters.

Table 9. Number and Percent of Student Participants by ESC

Pilot Group	Fall 2016		Spring 2017	
	<i>N</i>	%	<i>N</i>	%
Education Service Center 6	221	17.5	928	46.4
Education Service Center 13	721	57.2	778	38.8
Education Service Center 14	318	25.2	297	14.8
Total	1,260	100.0	2,003	100.0

Note: ESC 6 data reflects participating schools from ESC 5. ESC 14 data reflects participating schools from ESC 15 and ESC 16.

Summary of Student Participant Pre- and Post-Test Scores

Of the 2,003 student participants, the number that completed both a pre-test and post-test assessment was 1,978 (98.8%). The means and standard deviations of the pre-test and post-test assessments are reported in Table 10. These means were tested using a paired samples t-test. The result of those tests indicated students made statistically significant gains to their pre-test scores ($p < .05$) in all three groups. On average, the magnitude of those gains was 0.60 standard deviations or about 16 percentage points. The largest gains were reported among students in the ESC 6 group ($d = .84$). The smallest gains were reported among students in the ESC 14 group ($d = .20$).

Table 10. Means and Standard Deviations of Student Pre- and Post-Test Lesson Study Assessments

Fall 2016 Pilot							Spring 2017 Pilot							
		Pre-Test		Post-Test					Pre-Test		Post-Test			
Pilot Group	N	M	SD	M	SD	d	N	M	SD	M	SD	d		
ESC 6	206	66.6	19.4	81.0	22.4	0.69*	928	57.0	25.2	76.3	20.7	0.84*		
ESC 13	707	48.0	28.5	71.0	26.6	0.83*	778	43.5	28.2	60.4	29.9	0.58*		
ESC 14	290	56.1	30.1	61.2	32.6	0.16*	297	62.2	28.4	67.9	28.7	0.20*		
Total	1,213	53.2	28.4	70.4	28.2	0.61*	2,003	52.5	27.9	69.0	26.8	0.60*		

Note: Means reflect the percent of correct responses to the assessment developed by the Lesson Study group.

* Statistically significant ($p < .05$)

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

Student Responses to the Post-Lesson Survey

In addition to receiving a pre-test and post-test assessment, students were invited to respond to a paper survey about their opinions of the lesson (Appendix B). Student responses to how well they understood the lesson are reported by category and pilot in Table 11. Overall, 89 percent of students from the spring 2017 pilot indicated that they understood most or all of the lesson¹⁰. This percentage was highest among the students in the ESC 14 group (91.0%), although this percentage was comparable across the other ESC groups.

¹⁰ This number was computed by adding the percent of students who “understood the lesson” and “understood most of the lesson” reported in Table 11.

Table 11. Student Perceptions About How Well They Understood the Lesson

Pilot Group	N	Understood the lesson	Understood most of the lesson	Somewhat confused	Did not understand
Fall 2016					
Education Service Center 6	536	65.0	30.9	3.6	0.6
Education Service Center 13	296	52.7	37.1	2.0	8.1
Education Service Center 14	407	38.1	39.6	14.9	7.3
Fall Total	1,239	53.2	35.3	6.9	4.6
Spring 2017					
Education Service Center 6	107	54.2	34.6	10.3	0.9
Education Service Center 13	1,014	51.6	37.0	8.5	3.0
Education Service Center 14	199	50.3	40.7	8.0	1.0
Spring Total	1,320	51.6	37.3	8.6	2.5

Note: The values reported above reflect the percent of students who responded to each category.

Student participants were also asked about the difficulty of the work associated with the lesson. Student responses are reported by category and pilot in Table 12. Seventy-five percent (74.9%) of students responded that the level of work was just right for the lesson (Table 12). This result was consistent among students across all three ESC groups.

Table 12. Student Perceptions About the Level of the Work Associated with the Lesson

Pilot Group	N	Too Hard	Just Right	Too Easy
Fall 2016				
Education Service Center 6	536	13.4	75.0	11.6
Education Service Center 13	296	5.4	72.6	22.0
Education Service Center 14	407	14.5	72.9	12.6
Fall Total	1,239	11.9	73.7	14.4
Spring 2017				
Education Service Center 6	107	5.6	75.7	18.7
Education Service Center 13	1,014	6.6	76.4	17.0
Education Service Center 14	199	4.5	66.8	28.6
Spring Total	1,320	6.2	74.9	18.9

Note: The values reported above reflect the percent of students who responded to each category.

The percent of students that thought the lesson was typical is reported by ESC group in Table 13. Overall, 44 percent of students believed that the lesson offered during the spring 2017 pilot was typical of other lessons. This percentage was comparable across the ESC groups.

Table 13. Percent of Students Who Indicated the Lesson Was Typical of Other Lessons by ESC (N = 1,239)

Pilot Group	N	%
Fall 2016		
Education Service Center 6	536	70.9
Education Service Center 13	296	41.9
Education Service Center 14	407	40.5
Total	1,239	54.0
Spring 2017		
Education Service Center 6	107	46.7
Education Service Center 13	1,014	43.7
Education Service Center 14	199	41.7
Total	1,320	43.6

Note: *N* reflects the total number of students in the pilot. The percentage reflects the percent of students who responded that the class was typical of a normal class.

The percent of students that responded favorably to how well they enjoyed the lesson is reported by ESC group in Table 14. Overall, most students reported they enjoyed the lessons developed by the Lesson Study groups (63.4%). This result was slightly lower for the ESC 13 group (58.6%) but still favorable.

Table 14. Percent of Students Who Responded Favorably to the Lesson (N = 1,239)

Pilot Group	N	%
Fall 2016		
Education Service Center 6	536	77.0
Education Service Center 13	296	78.7
Education Service Center 14	407	63.8
Fall Total	1,239	73.2
Spring 2017		
Education Service Center 6	107	84.1
Education Service Center 13	1,014	58.6
Education Service Center 14	199	76.8
Spring Total	1,320	63.4

Note: *N* reflects the total number of students in the pilot. The % reflects the percent of students who responded, “strongly agree” or “agree.”

Student In-Person Interviews

Lastly, the students who participated in the lessons were invited to engage in a separate in-person interview (Appendix B). This resulted in 87 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 mentioned that lessons were engaging. They also reported that they enjoyed the group discussions most and that this was the activity that helped them to learn best.

“I enjoyed the fact that the lesson was interactive and what engages efficient learning.”

“I liked when we got to discuss the articles as partners and/or groups. I felt like hearing other people’s thoughts and opinions helped me better understand the article.”

“The thing that helped me learn more what working with a group because some questions were a little hard to answer but my group helped out.”

“Listening to other students tell what they did on their problems helped me learn. Working with a partner helped me best.”

SUMMARY AND RECOMMENDATIONS

Summary

Three Education Service Centers were contracted to pilot the Lesson Study Professional Development program (ESCs 6, 13, and 14) during SY 2016–17. This report detailed findings from the spring 2017 pilot. The spring pilot included 118 teacher participants, 29 of which also participated in the fall 2016 pilot. Teachers were then placed into 1 of 32 groups and developed research-based lessons. These lessons were taught to 2,003 students. Eighty-four percent (83.9%) of the research-based lessons focused on either English language arts and reading or mathematics.

One of the goals of the Lesson Study professional development program was to improve a teacher’s sense of self-efficacy. The results from a survey distributed to teachers during the spring 2017 pilot indicated statistical differences in several of the survey items. Teachers reported gains in (a) the time they received to collaborate with colleagues, (b) feelings of expertise in the content area taught, and (c) viewing their colleagues as experts. The survey item observing the greatest gain was (d) teacher’s confidence in their teaching ability.

Lesson Study facilitators, teachers, and administrators were also asked about their perceptions of the Lesson Study process. Several common themes emerged from the data. The change to a full-day orientation during the spring 2017 pilot improved the Lesson Study process. The added block of time at the beginning of the Lesson Study provided more time for teachers to develop and revise the lesson. Facilitators also commented on the value of the existing Lesson Study resources (i.e., the lesson proposal template and textbook). Teachers wanted examples and the resources provided by the program helped them conduct the Lesson Study.

The Lesson Study pilot conducted during the spring 2017 also promoted growth. Eighty-four percent (84.3%) of teachers and 93 percent of administrators reported that the Lesson Study impacted the teachers' professional growth, a direct aim of the program. Teachers valued the opportunity to spend time reflecting on a lesson, which was not always available to them during the regular school day. Administrators commented that the Lesson Study enabled teachers to gain a deeper understanding of the TEKS and how to improve the way in which lessons are delivered to students.

Students also demonstrated growth from the Lesson Study. The results from course-based assessments indicated that students made statistically significant gains ($p < .05$) to the pre-test scores in all three groups. On average, the magnitude of those gains was 0.60 standard deviations or approximately 16 percentage points. Further, most students indicated that they understood most or all of the lessons (88.9%) and enjoyed them (63.4%).

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 Pilot program:

- **Continue providing a full-day workshop to begin the Lesson Study.** Facilitators generally reported that the full-day workshop at the beginning of the Lesson Study provided teachers with more time to identify a theme, establish a plan of action, and address questions about the process. This workshop was new to the spring 2017 pilot, and ESC program managers are encouraged to continue this strategy. Some teachers and facilitators suggested a second full-day workshop would be beneficial. The feasibility of this request is not clear, but it seems that participants valued extended meeting times over shorter, more frequent meetings.
- **Continue to emphasize that the purpose of the Lesson Study is professional development.** Data from the spring 2017 pilot suggest that some administrators and teachers continue to feel that the time required for Lesson Study is unrealistic of lesson planning in practice. The purpose of Lesson Study is not to replace existing practices, although some elements of the Lesson Study process may inform them. This was communicated to participants of the program, but coordinators and facilitators may need to continue to emphasize the program's focus with participants.
- **Continue to provide external support as the Lesson Study Professional Development program is expanded.** Several administrators and teachers expressed concerns about the level of support required to expand Lesson Study. It is recommended that the ESCs continue to provide some level of external support to schools even as more teachers and instructional coaches are trained on conducting Lesson Study.
- **Leverage Professional Learning Communities (PLCs) as a source of information for Lesson Study groups.** There were a number of comments from teachers about the challenge of locating and synthesizing research. Professional learning communities may be a practical way to assist teachers with this process.

- **Expand the additional resources and information currently available on Texas Gateway.** Teachers commented that additional examples of lesson proposals would be beneficial to those learning the process of Lesson Study. Some lesson proposals and materials are available on the Texas Gateway website. It is assumed that those resources will grow as more teachers continue to participate in the Lesson Study Professional Development program. However, ESC program managers are encouraged to explore additional resources that might assist the Lesson Study groups until more lesson proposals are developed and made available on the Texas Gateway website.
- **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 (e.g., teachers within their schools). This may extend the value and reach of the Lesson Study Professional Development program.
- **Consider Lesson Study as a summer or fall professional development program.** Lesson Study is a significant investment in time for schools, teachers, and facilitators. Program participants and school administrators commented that the summer would be the preferred time to conduct Lesson Study. If Lesson Study must be offered during the school year, it may be best to offer the program in the fall when schools are less likely to be in a position where they must prioritize obligations associated with State of Texas Assessments of Academic Readiness (STAAR) testing.

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APPENDIX A: Student Expectations (SEs) from the Texas Essential Knowledge and Skills (TEKS)

English Language Arts and Reading TEKS

Grade Level	Subject	SE	Rule Text	# of Groups
K	ELA/R	K(13)(C)	revise drafts by adding details or sentences	1
1	ELA/R	1(17)(E)	publish and share writing with others	1
		1(24)(A)	gather evidence from available sources (natural and personal) as well as from interviews with local experts	1
		1(24)(B)	use text features (e.g., table of contents, alphabetized index) in age-appropriate reference works (e.g., picture dictionaries) to locate information	1
		1(24)(C)	record basic information in simple visual formats (e.g., notes, charts, picture graphs, diagrams)	1
2	ELA/R	2(14)(C)	describe the order of events or ideas in a text	3
		2(17)(C)	revise drafts by adding or deleting words, phrases, or sentences	1
3	ELA/R	3(F19)(D)	make inferences about text and use textual evidence to support understanding	1
4	ELA/R	4(15)(C)	revise drafts for coherence, organization, use of simple and compound sentences, and audience	1
7	ELA/R	7(11)	analyze, make inferences and draw conclusions about persuasive text and provide evidence from text to support their analysis	1
		7(F19)(D)	make complex inferences about text and use textual evidence to support understanding	1
English I	ELA/R	E1(15)(A)(i)	write an analytical essay of sufficient length that includes: effective introductory and concluding paragraphs and a variety of sentence structures	1
		E1(15)(A)(ii)	write an analytical essay of sufficient length that includes: rhetorical devices, and transitions between paragraphs	1
		E1(15)(A)(iii)	write an analytical essay of sufficient length that includes: a controlling idea or thesis	1
		E1(15)(A)(iv)	write an analytical essay of sufficient length that includes: an organizing structure appropriate to purpose, audience, and context	1
		E1(15)(A)(v)	write an analytical essay of sufficient length that includes: relevant information and valid inferences	1

Mathematics TEKS

Grade Level	Subject	SE	Rule Text	# of Groups
K	Math	K(3)(B)	solve word problems using objects and drawings to find sums up to 10 and differences within 10	1
1	Math	1(1)(E)	create and use representations to organize, record, and communicate mathematical ideas	1
		1(2)(E)	use place value to compare whole numbers up to 120 using comparative language	1
		1(5)(D)	represent word problems involving addition and subtraction of whole numbers up to 20 using concrete and pictorial models and number sentences	1
		1(5)(E)	understand that the equal sign represents a relationship where expressions on each side of the equal sign represent the same value(s)	1
		1(5)(F)	determine the unknown whole number in an addition or subtraction equation when the unknown may be any one of the three or four terms in the equation	1
		1(7)(A)	use measuring tools to measure the length of objects to reinforce the continuous nature of linear measurement	1
2	Math	2(3)(B)	explain that the more fractional parts used to make a whole, the smaller the part; and the fewer the fractional parts, the larger the part	1
3	Math	3(3)(F)	represent equivalent fractions with denominators of 2,3,4,6, and 8 using a variety of objects and pictorial models, including number lines	1
		3(5)(B)	represent and solve one- and two step multiplication and division problems within 100 using arrays, strip diagrams, and equations	1
4	Math	4(8)(C)	solve problems that deal with measurements of length, intervals of time, liquid volumes, mass, and money using addition, subtraction, multiplication, or division as appropriate	1
5	Math	5(1)(A)	apply mathematics to problems arising in everyday life, society, and the workplace	1
		5(1)(B)	use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution	1
		5(1)(F)	analyze mathematical relationships to connect and communicate mathematical ideas	1
		5(4)(H)	represent and solve problems related to perimeter and/or area and related to volume	1
		5(9)(A)	represent categorical data with bar graphs or frequency tables and numerical data, including data sets of measurements in fractions or decimals, with dot plots or stem-and-leaf plots	1
		5(9)(C)	solve one- and two-step problems using data from a frequency table, dot plot, bar graph, stem-and-leaf plot, or scatterplot	1
		5(10)(F)	balance a simple budget	1

7	Math	7(5)(B)	describe π as the ratio of the circumference of a circle to its diameter	1
		7(6)(I)	determine experimental and theoretical probabilities related to simple and compound events using data and sample spaces	1
		7(8)(C)	use models to determine the approximate formulas for the circumference and area of a circle and connect the models to the actual formulas	1
		7(9)(A)	solve problems involving the volume of rectangular prisms, triangular prisms, rectangular pyramids, and triangular pyramids	1
		7(9)(C)	determine the area of composite figures containing combinations of rectangles, squares, parallelograms, trapezoids, triangles, semicircles, and quarter circles	2
		7(11)(A)	model and solve one-variable, two-step equations and inequalities	1
Algebra II	Math	A2(6)(I)	solve rational equations that have real solutions	1

Social Studies TEKS

Grade Level	Subject	SE	Rule Text	# of Groups
6	Social Studies	6(3)(D)	create thematic maps, graphs, charts, models, and databases depicting aspects such as population, disease, and economic activities of various world regions and countries	1

Science TEKS

Grade Level	Subject	SE	Rule Text	# of Groups
1	Science	1(10)(A)	investigate how the external characteristics of an animal are related to where it lives, how it moves, and what it eats	1
6	Science	6(11)(A)	describe the physical properties, locations, and movements of the Sun, planets, Galilean moons, meteors, asteroids, and comets	1

APPENDIX B: Lesson Study Surveys

Teacher Self-Efficacy Survey

On a scale from 1–5 (Strongly Disagree to Strongly Agree):

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

Teacher Reflection Survey

On a scale from 1–5 (Strongly Disagree to Strongly Agree):

1. The outside facilitator was prepared, open to our ideas, and encouraged discussion.
2. I understood the objective(s)/purpose of our Lesson Study meetings.
3. I was given the opportunity to share my ideas and felt listened to.
4. We achieved our meeting objectives by the end of each meeting.
5. Research informed decisions and discussions during this phase.
6. Our Lesson Study work during this phase will lead to improved student outcomes for our selected TEKS.
7. If you could summarize your work in this phase, what have you learned or what has your team accomplished?

Teacher Reflection: Phase Specific Questions

Phase 1:

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.

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

Phase 2:

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

1. 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
2. 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

Phases 3 and 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).

1. 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 Lesson
 - f. Hearing from a final commentator (outside observer)
2. 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 Lesson
 - f. Haring from a final commentator (outside observer)

Teacher Participant Survey

1. Which of the following best describes your role in Texas Lesson Study for the spring 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).
2. Did you participate in the Texas Lesson Study in the fall semester (Yes, No). If so, please describe specifically how your experience compares to the fall semester.
3. Which part of the Lesson Study process did you find the most beneficial? Why?
4. Which part of the Lesson Study process did you find the most challenging? Why?
5. Participating in the Lesson Study has impacted student growth. (Likert scale: Strongly Disagree to Strongly Agree).
6. Participating in the Lesson Study has impacted my professional growth. (Likert scale: Strongly Disagree to Strongly Agree)
7. What changes to the Lesson Study Pilot Program would you recommend for next year? (open ended)
8. Did you have sufficient time to go through the Lesson Study process? (Yes, No, Maybe)
9. Which section of the Lesson Proposal was the most beneficial in your teaching practice? Why? (Open ended)
10. 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). (Likert scale: Strongly Disagree to Strongly Agree)
11. I would like to go through the Lesson Study process again. (Likert scale: Strongly Disagree to Strongly Agree)
12. Would you participate in Lesson Study again without receiving a stipend? Why or why not? (Yes, No, Maybe)
13. Additional Comments:

Administrator Survey

1. How did participation in the Lesson Study process impact your teachers? (open ended)
2. What changes to the Lesson Study Pilot Program would you recommend for next year? (open ended)
3. Were you able to sit in on any of the Lesson Study sessions? (Yes, No)
 - a) If so, 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)
4. Lesson Study impacted student growth. (Likert scale: Strongly Disagree to Strongly Agree)
5. Lesson Study impacted teachers' professional growth. (Likert scale: Strongly Disagree to Strongly Agree)
6. Are you interested in implementing Lesson Study campus-wide? Why or why not? (open ended)
7. If teachers had to meet after school for the Lesson Study meetings, would you be willing to adjust the master schedule next year to build in time for 1 hour weekly Lesson Study meetings? Why or why not? (open ended)
8. The designed lesson is aligned to the T-TESS framework. (Likert scale: Strongly Disagree to Strongly Agree)
9. Additional Comments:

Student Survey

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 really 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 really did not like the lesson.)
4. Today's lesson seemed _____ what we normally do in class.
 - a. different than
 - b. the same as

Student Interview Questions

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?