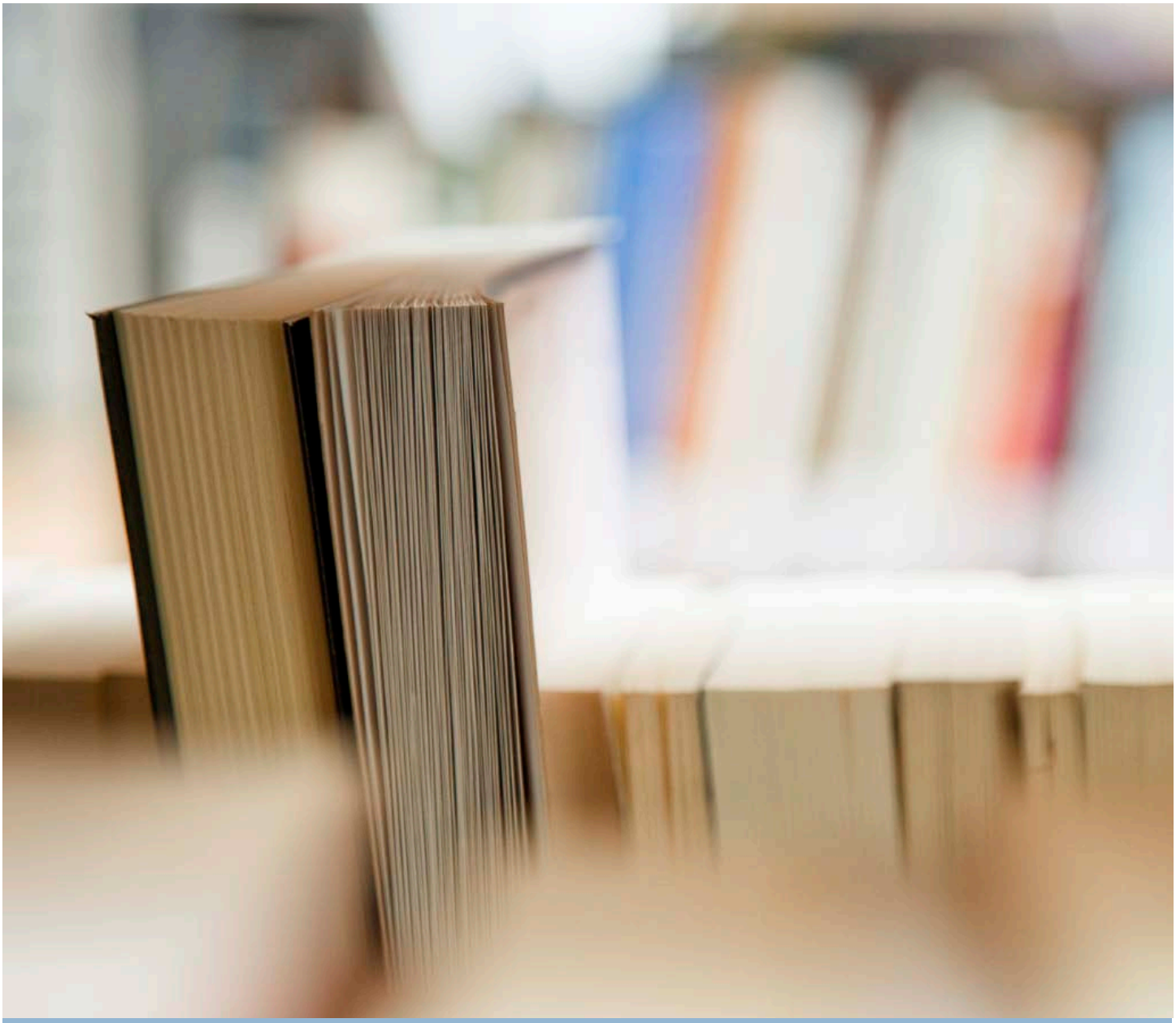


Texas Lesson Study

Professional Development Pilot Program:
Report on Program Effectiveness – Fall 2016

Forrest C. Lane, Ph.D.

January 5, 2017

This page is intentionally left blank.

EVALUATOR INFORMATION

This report was written by Forrest C. Lane, assistant professor in the Department of Educational Leadership at Sam Houston State University. He holds a Ph.D. in educational research from the University of North Texas. Prior to working at Sam Houston State University, he served as an evaluation analyst in the Department of Evaluation and Assessment at Dallas Independent School District. He also served as an assistant professor in the Department of Educational Studies and Research at the University of Southern Mississippi. Dr. Lane is a member of the American Educational Research Association (AERA), National Association of Developmental Education (NADE), and board member of the Southwest Educational Research Association.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

Brief Background

The Texas Education Agency (TEA) piloted 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). Data from the pilot were collected in the form of surveys, in-person interviews, and locally designed assessments. This report examined data collected from fall 2016, 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. A separate evaluation will be conducted for the pilot to be conducted in spring 2017.

Summary of Key Findings

The fall 2016 pilot included 120 teachers from 26 schools and 15 school districts. Teachers were combined into 1 of 33 lesson study groups. The lessons created by the groups were then delivered to 1,260 students across grades K–10, although teachers from the pilot instructed a total of 7,207 students during the fall and some of these students 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 or mathematics.

Teachers who participated in the lesson study reported statistically higher levels of confidence about their teaching ability ($p < .05$)[1] and this change was moderately large ($d = 0.7$)[2]. Many teachers commented that the lesson study process enabled them to learn from their peers. Eight-two percent (82.2%) of

[1] 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).

[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.

participating teachers and 88.9 percent of administrators reported that lesson study impacted teacher's professional growth.

Students demonstrated statistically significant gains ($p < .05$) from pre-test to post-test on locally developed assessments by the lesson study groups. The magnitude of the gain on the assessments was approximately 17 percentage points. Students reported that they understood most or all of the lessons (88.5%) and enjoyed them (73.2%). 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.

Several common themes were also identified from the open-ended responses of facilitators, teachers, and administrators about the lesson study process. Many teachers commented that lesson study provided time for planning and reflection not usually available to them during the school day but that more time may be needed to complete the lesson study process. Teachers and administrators recommended that lesson study be conducted during the summer or that lesson study be conducted over a shorter time span. Teachers and administrators also commented on the value and importance of administrative support to the lesson study process. Substitute teachers were widely utilized to help enable teachers to step outside of the classroom and focus on implementing the phases of lesson study. However, there was less availability of substitute teachers for small rural schools participating in the lesson study. More support and coordination for lesson study may be needed by the ESCs to support this group.

Collectively, the evidence from the lesson study pilot suggested value for both teachers and students. Recommendations included in this report are intended to help guide program managers and the program director as they continue to implement Lesson Study Professional Development Program across the State of Texas.

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.

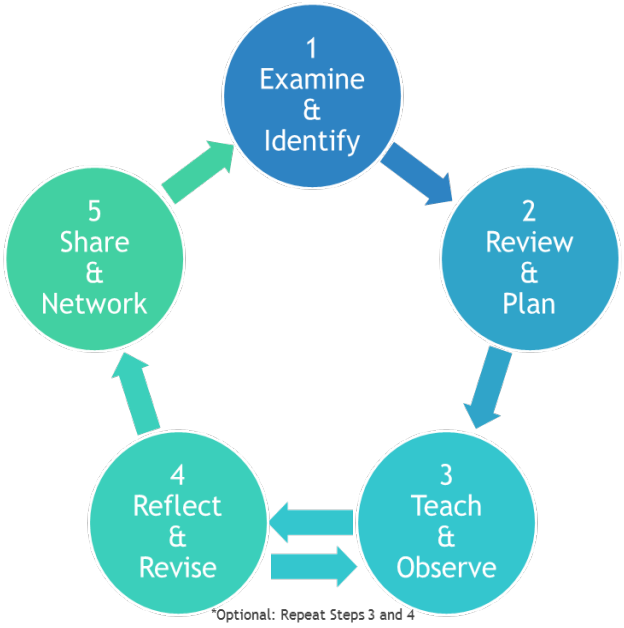
Overview of Lesson Study

Lesson Study is a form of job-embedded, professional development for teachers that use 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 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.



Purpose and Goal of Lesson Study

The Texas Education Agency contracted with Education Service Center Regions 6, 13, and 14 to pilot the lesson study professional development pilot 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

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, the three pilots resulted in 26 schools from 15 school districts across the state that participated in the professional development program. Demographic characteristics of participating schools are reported in Table 1.

Table 1. Demographic Characteristics of Participating Pilot Schools (N = 26)

Characteristic	**N**	**Percent**
Student Enrollment		
0–250	1	3.8
251–500	10	38.5
501–750	7	26.9
751–1,000	6	23.1
1,001 +	2	7.7
Local Category		
Rural	6	23.1
Town	5	19.2
Suburb	7	26.9
City	8	30.8
% Economically Disadvantaged		
0–25%	7	26.9
26–50%	11	42.3
51–75%	5	19.2
76–100%	3	11.6

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

A list of all participating schools by school district and ESC is provided in Table 2. The number of teachers participating in the lesson study pilot across all schools in the fall semester was 120. The average number of years teaching among participants in the ESC 6 and ESC 13 pilots was 13. The average number of years teaching for those who participated in the ESC 14 pilot was 11[3].

Table 2. 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 Elementary	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
Leander Middle School	Leander ISD
Regan Elementary	Leander ISD
Vista Ridge High School	Leander ISD
Bill Burden Elementary	Liberty Hill ISD
Liberty Hill Intermediate	Liberty Hill ISD
Ojeda Middle	Del Valle ISD
Teravista Elementary	Round Rock ISD
Education Service Center 14*	
Dyess Elementary	Abilene ISD
Academy of Technology, Engineering, Math & Science	Abilene ISD
Craig Middle School	Abilene ISD
Hawley Middle School	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.

[3] The average number of years teaching was based on participating teachers within each of the three pilot groups.

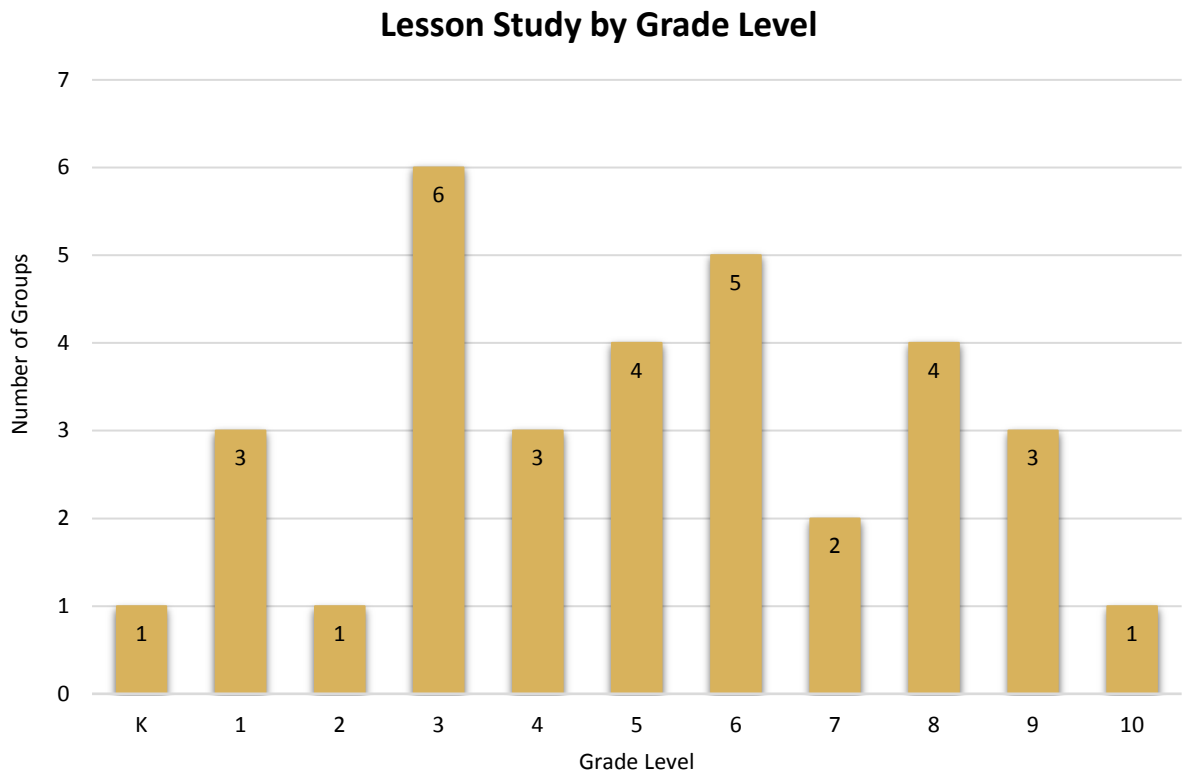
Lesson Study Program Implementation

Teachers from each of the participating schools were combined into lesson study groups. Groups consisted of 2 to 5 teachers and these groups were guided through the lesson study process (Figure 1) by a facilitator from one of the regional ESCs. Facilitators met weekly with the teachers in each group between the months of September and November of 2016.

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.

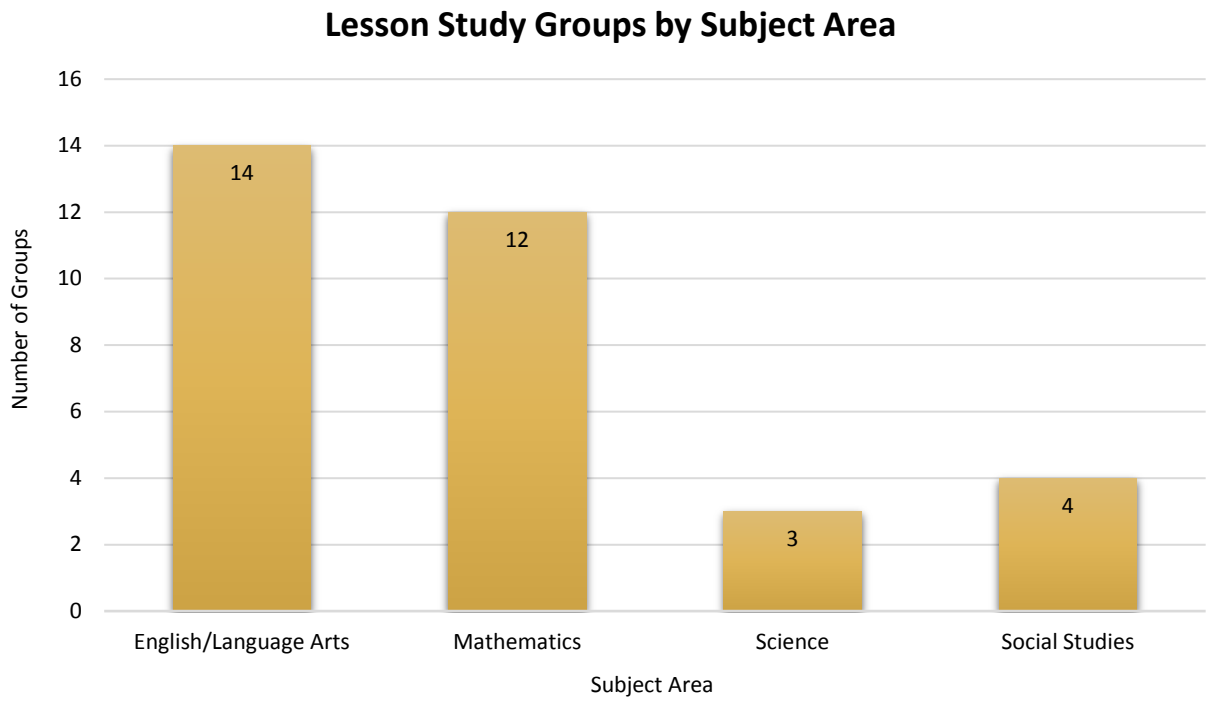
The number of lesson study groups is reported by grade level in Figure 2. Groups created lessons for grade levels ranging from Kindergarten to Grade 10. A greater number of groups created lessons for Grade 3 or Grade 6. In some instances, teachers within a group targeted more than one grade level for the lesson study. When more than one grade level was the focus of a lesson study, the group typically targeted Grades 3–5 or Grades 6–8.

Figure 2. Number of Lesson Study Pilot Groups by Grade Level (N = 33)



The number of lesson study groups is reported by subject area in Figure 3. Most groups focused the lesson study on either mathematics (*N* = 12) or English language arts (*N* = 14). The remaining groups focused the lesson study on science (*N* = 3) or social studies (*N* = 4).

Figure 3. Number of Lesson Study Groups by Subject Area (N = 33)



Data Collection

Data was collected from ESC facilitators, teachers, administrators, and students throughout the lesson study process. Lesson study facilitators responded to a survey on the attitudes of their group members and provided reflections about the lesson study process after each weekly meeting. Teachers completed a pre-test and post-test measure of their level of self-efficacy as well as a 10-item survey about the lesson study process upon completion of the professional development program. 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 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 may be found in Appendix B.

RESULTS

Q1. How did the lesson study professional development pilot program affect teacher's sense of self-efficacy?

A pre-test and post-test measure of teacher self-efficacy (Appendix B) was distributed to all teachers in the lesson study pilot between September and December of 2016. The survey was developed by the program managers from each of the coordinating ESCs (i.e., ESC 6, ESC 13, ESC 14) and TEA project director. The number of teachers that completed the pre-test survey was 156. This number was greater than the number of participants in the lesson study but responses were anonymous and it was not possible to determine which teachers may have responded more than once. As such, the scores from all respondents were included in the pre-test survey. The internal consistency of scores from the pre-test survey was α = .72[4]. The number of teachers that completed a post-test survey was 84 (67 % response rate). The internal consistency of scores from the post-test survey was α = .67. The results of both surveys are reported in Table 3.

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

	Pre-Test (*N* = 156)		**Post-Test (*N* = 84)**		
Teacher Self-Efficacy Pre-Survey	***M***	***SD***	***M***	***SD***	***D***
I am confident in my teaching abilities.	4.2	0.7	4.6	0.5	0.7*
I would recommend the teaching profession to others.	3.7	1.0	3.5	0.9	-0.2
I receive adequate time to collaborate with my colleagues.	3.4	1.1	3.1	1.1	-0.3
I am an expert in the content that I teach.	3.9	0.8	4.2	0.7	0.4*
I am comfortable discussing my classroom with others	4.7	0.6	4.8	0.4	0.2
I feel like a respected professional	4.1	0.9	3.8	1.0	-0.3*
I view my colleagues as experts in the field of teaching.	4.4	0.7	4.4	0.6	0.0
Collaborative professional development positively impacts student learning.	4.7	0.6	4.6	0.5	0.0

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

* Statistically significant ($p < .05$).

Scores from the pre-test survey and post-test survey items were compared using an independent samples *t*-test (α = .05). Data were collected anonymously and responses to the pre-test survey could not be matched to responses from the post-test survey. The results of the *t*-tests indicated that the scores of three items were statistically different from pre-test to post-test. Teachers who participated in the lesson study pilot showed statistical gains in their confidence of their teaching ability and their belief about being

[4] Alpha (α) is a measure of internal consistency.

an expert in the content they instructed. Teachers reported statistical declines in their feelings about being respected as professionals. However, the magnitude of the change between the pre-test and the post-test was considered small for most survey items[5]. Only the change in teachers' confidence about their teaching ability was considered moderately large (*d* = .70).

Q2. What were the perceptions of facilitators, teachers, and administrators about the lesson study process?

Perceptions of Facilitators

Facilitators were asked to respond to a brief survey after each weekly meeting with the lesson study groups (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. Facilitators generally reported that group members met or exceeded their expectations during the weekly meetings. These percentages were lower during the initial meeting about group members' understanding of the lesson study cycle, willingness to listen and ask questions, and their reflections. However, the facilitator ratings of the lesson study groups generally improved toward the final group meeting.

Table 4. Percent of Facilitators Indicating Group Members Met or Exceeded Expectations (N = 33)

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

Note: The % reflected in the final meeting consists of responses from 32 groups. One facilitator did not complete any additional surveys after the initial group meeting.

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

Facilitators were also invited to provide additional comments as part of the weekly surveys. These comments generated approximately twenty pages of single-spaced text. The themes that emerged from the comments of facilitators are reported below.

TEACHERS WERE INITIALLY UNFAMILIAR WITH THE LESSON STUDY PROCESS

Facilitators suggested some of the teachers were unfamiliar with the lesson study process and unclear about the expectations of the program. This seemed to be supported by the general ratings of the lesson study groups. Specifically, facilitators were asked to rate the trend for each meeting using a Likert scale (1 = lowest; 5 = highest). Ratings were consistently lower for the initial group meetings (*M* = 2.8, *SD* = 1.1) in comparison to all other group meetings.

> "*I had several who were very skeptical about the whole thing, many questions. Asking "what's in it for them? Others seemed scared, very quiet, but taking in all the information.*"
>
> *"They had many questions about the cycle and phases."*
>
> *"Teachers were not really aware of the time requirements and were a little frustrated with my responses about meeting once a week for the next month and a half."*
>
> *"The group is struggling with the concept of lesson study and how it works."*

Despite the initial group ratings and comments about teacher unfamiliarity with the lesson study process, many facilitators also reported that the teachers were enthusiastic and eager to work on the project.

> *"Teachers definitely appear overwhelmed, but when I gave them a chance to reflect on meeting, they all expressed positive thoughts about how this will help them in their teaching."*
>
> *"They were very enthusiastic about the entire idea of Lesson Study."*
>
> *"The group was very receptive to the Lesson Study process and project."*

LESSON STUDY WAS A TIME COMMITMENT

Facilitators often commented how the groups worked beyond the scheduled meeting times for lesson study. This theme was consistent with responses of teachers discussed later in this report. Facilitators suggested that the effort of teachers to the lesson study process needed to be acknowledged by school district administration.

> *"We ended up staying to complete everything for this lesson and actually worked until 7:00 p.m."*
>
> *"They contributed additional time beyond our regular meetings."*
>
> *"The group worked almost three hours after school to finish up the Lesson Proposal."*
>
> *"Teachers need to be acknowledged regarding their commitment to lesson study, not just in their lesson study group, but by the administration, the school, and the school district."*

ADMINISTRATOR SUPPORT WAS IMPORTANT TO THE LESSON STUDY PROCESS

Many facilitators commented that the support of school administrators helped to improve the lesson study process. Instructional coaches were most commonly mentioned as a source of this support but support also came in the form of time made available during professional learning communities (PLCs). Substitute teachers were also used in some schools to create additional time for lesson study planning.

"They are allowing their [Instructional] Coaches to be a part of the discussions to learn more, the Principal and AP were all there eager to learn more about all of it…I feel with the support they already have from their Administration, this will be a very collaborative group."

"Instructional coaches have been wonderful with taking notes and also assisted with documenting all resources."

"It takes time to debrief and revise the research lesson, as well as perhaps the unit, especially for the first teaching. Thus, they asked their principal if they could have a full day substitute for the first research lesson teaching. They were excited when the principal said they could."

PRE-SERVICE TEACHERS ADDED VALUE TO THE LESSON STUDY PROCESS

The lesson study pilot focused on in-service teachers but some schools included pre-service teachers as a part of the professional development program. Facilitator comments from those groups suggested that the pre-service teachers added meaningful insight into the group.

"The preservice teachers had good insights into student thinking based on their own learning experiences and their own tutoring experiences."

"In-service teachers would not be as far along in the Lesson Study process if the preservice teachers were not also in their group."

THE LESSON STUDY PROCESS HAD PROFESSIONAL VALUE TO TEACHERS

Lastly, facilitators suggested that teachers perceived there was a professional value from the lesson study process.

"I believe they are beginning to see the benefits of this type of professional development…They realize they are participating in something that requires analytical thinking skills and that they are becoming practitioner-researchers, which in turn means an elevation in salary."

"One of the teachers noted this was the first time she really felt like a professional. The value of academic conversation about research, best practices, and student learning was valuable and her first experience at this level in her career."

"Participation in lesson study has already started to empower the teachers."

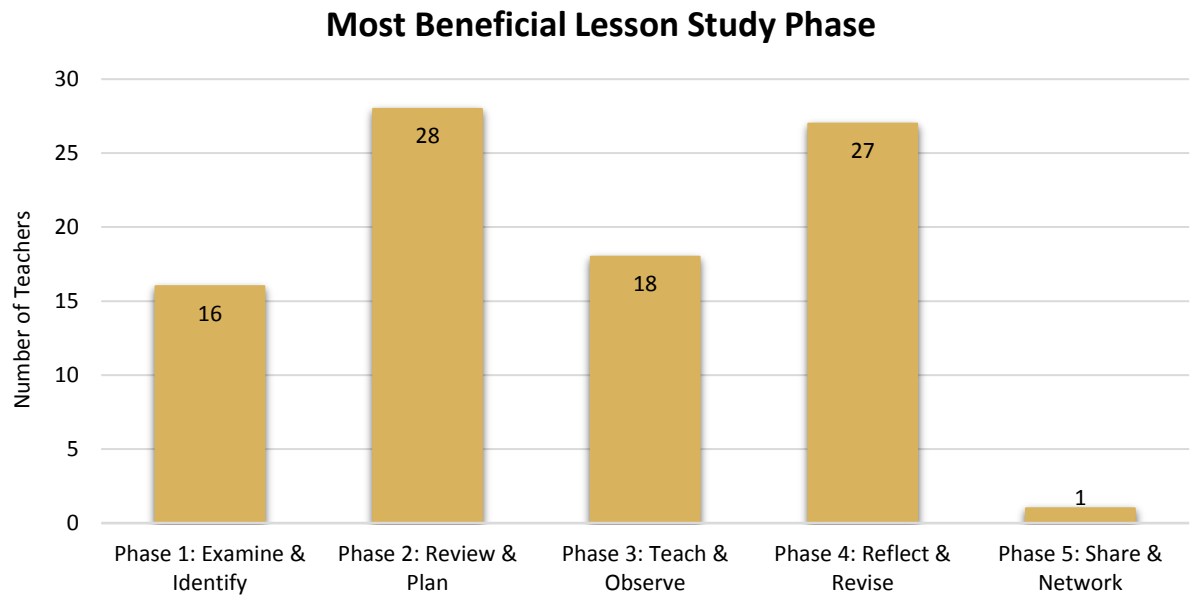
Perceptions of Teachers

Teachers were invited to respond to the Teacher Participant Post-Survey (Appendix B) about their experience in the professional development program. Of the 120 teachers participating in the lesson study pilot, 90 responded to the post- survey (73% response rate). A summary of teacher responses is provided below.

THE MOST BENEFICIAL PHASE OF LESSON STUDY

Teachers were asked to identify the phase of the lesson study process most beneficial to them. Responses to this question are reported in Figure 4. A greater number of teachers reported Phase 2 or Phase 4 to be the most beneficial phase of the lesson study process. Only one teacher reported Phase 5 to be the most beneficial of the lesson study process.

Figure 4. The Most Beneficial Phase of Lesson Study Reported by Teachers (N = 90)



When asked why a particular phase of the lesson study process was reported as being the most beneficial, the most common response from teachers was the benefit of time to plan and reflect. Many teachers mentioned that time for lesson study planning and revision was not available to them during the school day.

Phase 2: Review and Plan

> *"It is rare that we have time to research and use all of the resources at hand to thoroughly plan for our learners. It was especially enlightening for me to think intensely about how to scaffold grade level material for ELLs."*
>
> *"Planning the lesson was most valuable because we were really able to look at the TEK[sic], break it down and see what it is really asking, and find lesson plan resources that focused on that TEK[sic]."*
>
> *"Targeting a TEK[sic] and doing intentional research on the subject was eye opening to me because it helped me to see where we've gone wrong as teachers over the years and how imperative it is to make sure students have a very real understanding of fractions, fractional parts and total pieces."*

Phase 4: Reflect and Revise

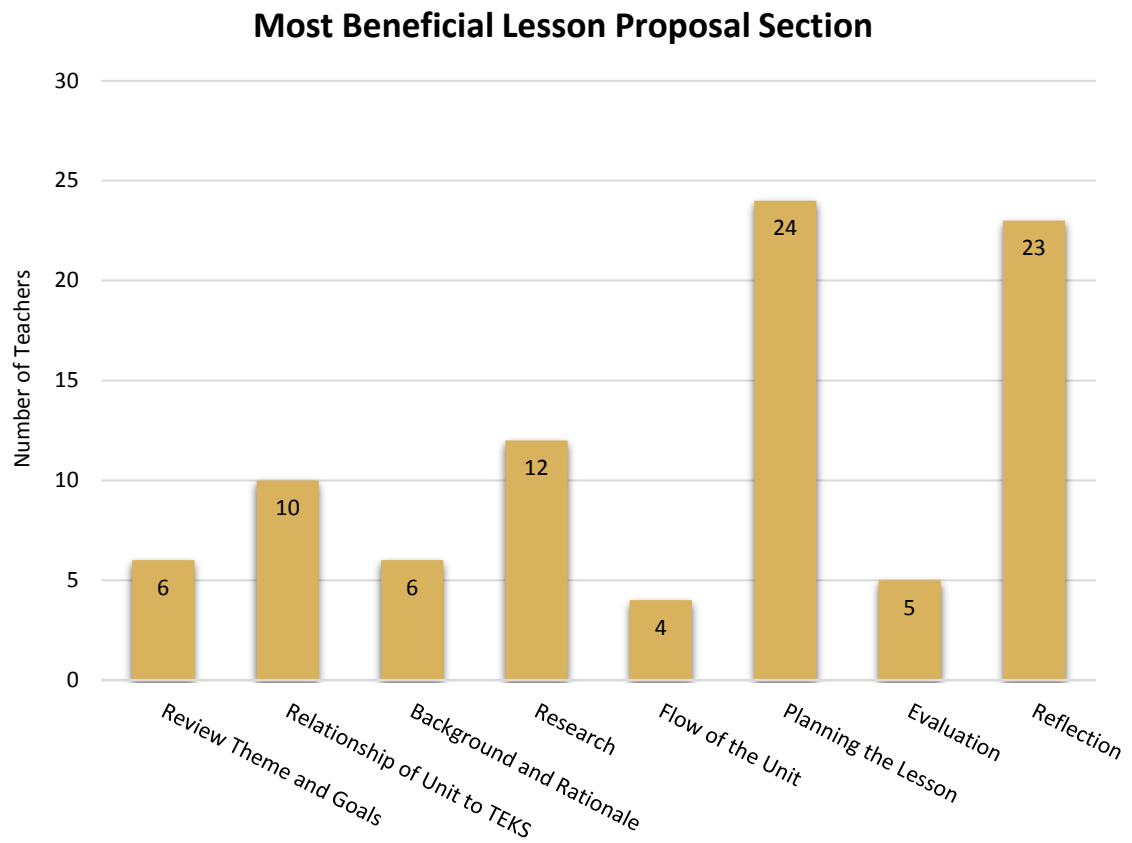
"This is part of the daily lesson planning process that is missing. I feel as teachers we are very in tune to what kids need, and what they struggle with. We rarely have or take the time to stop and reflect on what we could have changed."

"With any regular lesson that we teach, we do not have a chance to revise the less right then. We always say, 'Well, NEXT YEAR, I'll change that part of the lesson.' We do not have time or [the] opportunity to amend lessons right after teaching them. With this [lesson study], we were given both the time and opportunity to really improve the lesson, and it made a significant difference and impact."

THE MOST BENEFICIAL SECTION OF THE LESSON PROPOSAL

Teachers were also asked which section of the lesson proposal was most beneficial to them. A lesson proposal is the teachers' documentation of the collaborative work done throughout the lesson study cycle. The responses from teachers are reported in Figure 5. "Planning the Lesson" and "Reflection" were the most common sections of the lesson study proposal reported by teachers. Again, the benefit of time to plan and reflect was a common theme among teacher comments. However, teachers also mentioned the value of observing and learning from their peers.

Figure 5. The Most Beneficial Section of the Lesson Proposal Reported by Teachers (N = 90



Planning the Lesson

"Working with experienced teachers allowed me to understand student responses in a way I would not have been able to predict."

"I think it always helps to see how other teachers plan."

"Planning of the lesson was something I feel like I could best implement easily and naturally in other areas in my classroom without the whole lesson study team."

Reflection

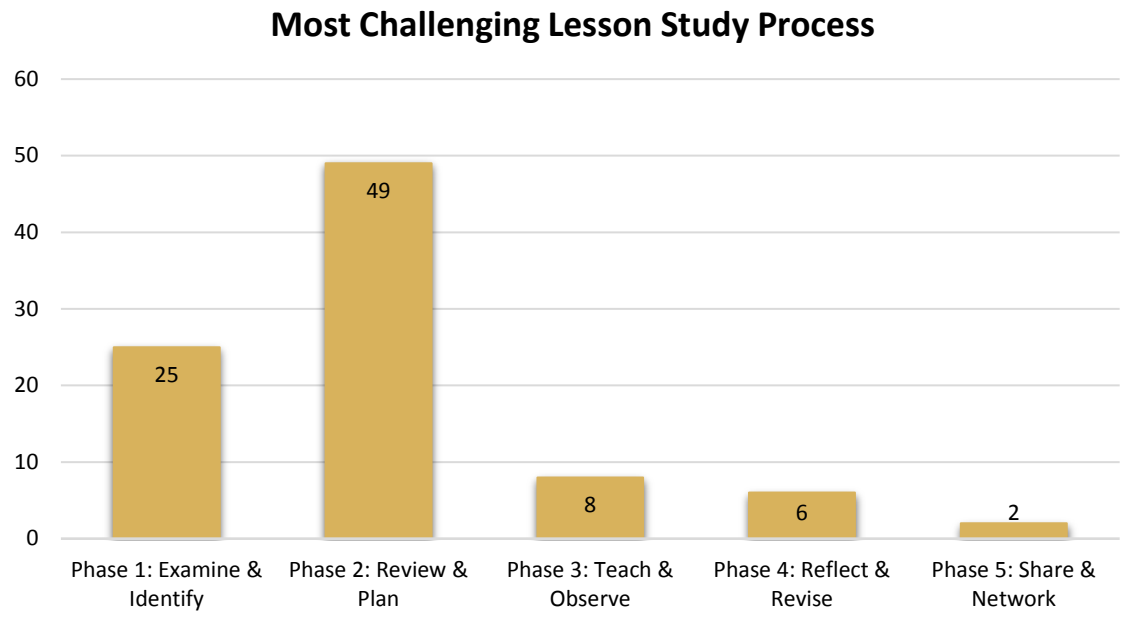
"Most days we don't get time to do this [reflection], so it was very beneficial to reflect and talk about what worked well and what we could improve."

"It helped [me] to be able to see the difference of a more student-led classroom versus more of a teacher-led classroom."

MOST CHALLENGING PHASE OF LESSON STUDY

Teacher responses to the most challenging phase of the lesson study cycle are reported in Figure 6. Phase 1 and Phase 2 were most commonly reported by teachers to be the most challenging. Although many teachers commented that lesson study provided more time for lesson planning, only 43.3 percent of teachers reported that the amount of time provided for the lesson study process was adequate.

Figure 6. Frequencies for the Most Challenging Lesson Study Process Reported by Teachers (N = 90)



Phase 1: Examine & Identify

A common theme that emerged from comments of teachers was the challenge in narrowing down the lesson to a standard from the TEKS.

> *"It was difficult to narrow down what exactly we wanted the project to be based on."*
>
> *"There were many TEKS that needed attention, and narrowing down the most effective one to teach was challenging."*

Phase 2: Review and Plan

Teachers also commented that the time required to complete Phase 2 of the lesson study process was not reflective practice in reality.

> *"This process was time-consuming and we were not given enough extra time outside of our regular responsibilities to complete this portion of the lesson."*
>
> *"Teachers don't have weeks to plan one lesson. The process is unrealistic."*
>
> *"Finding the research is not something that works in the real world of lesson planning. We are exposed to research based methods and good teaching will always use strategies that are research based."*
>
> *"We attend many workshops that are research based, so many of the instructional strategies/practices are already backed by research."*

STUDENT AND PROFESSIONAL GROWTH

The percent of teachers 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 (77.8%) and professional growth (82.2%). Further, most teachers reported that the process of collecting data during the lesson observation provided insight into the learning process (80%).

Table 5. Percent of Teachers Who Responded Favorably to Questions about Student and Professional Growth (N = 90)

Question	**%**
Participating in Lesson Study has impacted student growth	77.8
Participation in Lesson Study has impacted my professional growth	82.2
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

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 like to go through the lesson study process again (51.1%). Only 12 percent of teachers would participate in the lesson study without receiving a stipend.

Table 6. Percent of Teachers Who Responded Favorably to Repeating Lesson Study and Without Receiving a Stipend (N = 90)

Question	%
I would like to go through the Lesson Study process again	51.1
Would you participate in Lesson Study again without receiving a stipend	12.2

Perceptions of Administrators

At least one administrator from each of the 26 schools that participated in the lesson study was asked to complete a survey about the professional development program (Appendix B). All schools completed a survey (100% response rate) and one school had more than one administrator respond to it. Most administrators observed at least some part of the lesson study discussions (85.0%). Seventy-five percent (75%) of administrators indicated that the discussions among teachers were more in depth than was typical. Teacher conversations were often described using words such as "focused," "constructive," "targeted," and "powerful."

> "*This is the kind of high level conversation about teaching and learning that I hope all teams [can] experience*."
>
> *"The participation in Lesson Study showed my teachers the importance of research based strategies that impact student learning in the classroom and how to improve on the TEKS with which the students struggle.*
>
> *"The teachers who participated in the program have become much better at lesson planning. I have witnessed growth in their classroom management and in the way they present all of their lessons."*

The number and percent of administrators that responded favorably to survey items are reported in Table 7. Most administrators indicated that lesson study impacted both students' (77.8%) and teachers' growth (88.9%). All administrators (100.0%) 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 = 27)

Question	%
Discussions in the meetings were more in depth than typical team discussion	*75.0
Lesson Study impacted student growth	77.8
Lesson Study impacted teachers professional growth	88.9
The designed lesson is aligned to the T-TESS framework	100.0

*This percentage is based on the 23 administrators who were able to observe part of the Lesson Study.

A few administrators raised concerns that the lesson study process appeared to result in confusion for some teachers. These comments were supported by facilitators who also suggested that the lesson study process seemed unclear to teachers during the initial group meetings. It is possible that the comments of administrators reflect some of those initial meeting observations.

"Discussion about the process/procedures for the actual lesson study resulted in confusion and unclear expectations for the teachers."

"Meetings with the teachers themselves were productive and thought provoking. Meetings with the facilitator seemed to lack direction and little was accomplished."

Administrators also commented that time required for Lesson Study was substantial and in some cases, may be unrealistic given the obligations of teachers. Administrators suggested that the ESCs consider using the summer to conduct lesson study.

"A more realistic approach/time frame for planning one lesson [is needed]. To study a lesson that took teachers 8 weeks to plan is not realistic of what our teachers do every day."

"I think the amount of time put into planning these sessions is unrealistic. However, if this is only being done to create a bank of videos it should benefit teachers across the state."

ADMINISTRATOR INTEREST IN FUTURE LESSON STUDIES

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 in the future (Table 8). Only 22 percent of administrators reported that they were willing to implement lesson study campus-wide. The most common response was the lack of available time to implement the program within the school day. Similarly, only 25 percent of administrators were willing to adjust the school day schedule. Again, the lack of time was the reason most frequently reported among administrators, although some administrators also responded that it was not within their authority adjust the school day and that perhaps this was a decision best made by the district superintendent.

"We already utilize an alternate schedule to make time for PLC meetings. Too many schedule alterations are confusing to children and difficult for parents to adjust to."

"We have a number of focused meetings for PD, Leadership, and Lighthouse (Leader in Me). We do not have the time to focus solely on Lesson Study. That can be a part of our PD, but not all of it."

Table 8. Percent of Administrators Who Responded "Yes" to Questions about Lesson Study in the Future (N = 27)

Question	**%**
Are you interested in implementing Lesson Study campus wide?	22.2
Would you be willing to adjust the school day schedule next year to build in time for Lesson study meetings?	25.9

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

Student Participants by ESC Pilot Group

The number of students that participated in one of the lessons designed through the lesson study was 1,260, although teachers from the pilot instructed a total of 7,207 students during the fall semester and some of these students received the lessons at a later point in time. The number and percent of student participants are reported by ESC pilot in Table 9. The largest number of student participants was reported in the ESC 13 pilot (*N* = 712). The number of students served by lesson study was more comparable among the pilots in ESC 6 and ESC 14.

Table 9. Number and Percent of Student Participants by ESC

Pilot Group	***N***	**%**
Education Service Center 6	221	17.5
Education Service Center 13	721	57.2
Education Service Center 14	318	25.2
Total	**1,260**	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 Pre- and Post-Test Assessment Scores

Of the 1,260 students who participated in the lessons, the number that completed both a pre-test and post-test assessment was 1,203 (95.5%). The means and standard deviations of the pre-test and post-test assessments are reported by pilot in Table 10. The means were then 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 pilots. On average, the magnitude of those gains was 0.61 standard deviations or about 17 percentage points. The largest gains were reported among students in the ESC 13 pilot ($d = .83$). The smallest gains were reported among students in the ESC 14 pilot ($d = .16$).

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

		Pre-Test		***Post-Test***		
Pilot Group	***N***	***M***	***SD***	***M***	***SD***	***D***
Education Service Center 6	206	66.6	19.4	81.0	22.4	0.69*
Education Service Center 13	707	48.0	28.5	71.0	26.6	0.83*
Education Service Center 14	290	56.1	30.1	61.2	32.6	0.16*
Total	**1,213**	**53.2**	**28.4**	**70.4**	**28.2**	**0.61***

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 indicated that they understood most or all of the lesson[6]. This percentage was highest among the students in the ESC 6 pilot (95.9%). This percentage was lowest among students in the ESC 14 pilot, although the percent of students that understood the lesson in the ESC 14 pilot was still considered to be high (77.7%).

Table 11. Student Perceptions about How Well They Understood the Lesson (N = 1,239)

Pilot Group	*N*	Understood the lesson	Understood most of the lesson	Somewhat confused	Did not understand
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
Total	**1,239**	**53.2**	**35.3**	**6.9**	**4.6**

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

Students 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-four percent (73.7%) 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 pilots.

Table 12. Student Perceptions about the Level of the Work Associated with the Lesson (N = 1,239)

Pilot Group	*N*	Too Hard	Just Right	Too Easy
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
Total	**1,239**	**11.9**	**73.7**	**14.4**

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 pilot in Table 13. Overall, 54 percent of students believed that the lesson was typical. This percentage was highest among students in the ESC 6 pilot (70.9%). The responses from students in the ESC 13 and ESC 14 pilots were more comparable.

[6] This number was computed by adding the percent of students who "understood the lesson" and "understood most of the lesson" reported in Table 10.

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

Pilot Group	*N*	%
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

Note: *N* reflects the total number of students in the pilot. % 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 pilot in Table 14. Overall, most students reported they enjoyed the lessons developed by the lesson study groups (73.2%). This result was slightly lower for the ESC 14 pilot (63.8%) but still favorable.

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

Pilot Group	*N*	%
Education Service Center 6	536	77.0
Education Service Center 13	296	78.7
Education Service Center 14	407	63.8
Total	**1,239**	73.2

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

Student In-Person Interviews

Lastly, a sample of the 1,260 students who participated in the lessons were invited to engage in a separate in-person interview (Appendix B). This resulted in 117 interviews conducted by the lesson study facilitators. The interviews generated approximately 20 pages of single-spaced text. Despite the volume of data, many of the responses were specific to the individual lessons delivered by the lesson study groups. However, one theme was clearly identified from data. Many of the lessons appeared to have used group work or activities. This group work was consistently identified as the activity they enjoyed most and the activity that helped them to learn best.

> *"Working with my friends to help better understand it."*
>
> *"The communication in our group…I enjoyed this group communication because my partner helped me to understand the importance of the text."*
>
> *"Getting up and being able to interact. Usually we don't get to talk much. The teacher just teaches."*
>
> *"I enjoyed that we were able to get around and work with things with our partners."*
>
> *"Working with my partners. It is good to see different points of view."*

"Talking with my team to find the best main idea and supporting details because they had a good point that I didn't take into account."

SUMMARY AND RECOMMENDATIONS

Summary

Three Education Service Centers were contracted to pilot the Lesson Study Professional Development Program (ESCs 6, 13, and 14) during fall 2016. A total of 120 teachers from 26 schools and 15 school districts participated in lesson study. Teachers were placed into 1 of 33 groups and these groups developed lessons that were taught to 1,260 students. Seventy-eight percent (78.0%) of the lesson study groups focused their instruction on either English language arts and reading or mathematics.

One of the goals of the lesson study professional development program was to improve teacher's sense of self-efficacy. The results from a survey distributed to teachers indicated statistical differences in several of the survey items. Only the change in confidence about teaching ability was considered to be moderately large and noteworthy (d = 0.7). This finding was directly related to the aim of the program.

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 time required for lesson study was both a benefit and a challenge. Many teachers commented that lesson study provided time to plan and reflect on lessons, something many teachers could not do during the school day. However, these same teachers also commented that the time provided to complete the lesson study process was not enough in its current form. Further, teacher participation in lesson study required resources (e.g., substitute teachers, time) that were difficult to accommodate by some school administrators. Both teachers and administrators recommended that lesson study be conducted during the summer when more time for planning and reflection would be available.

Another theme that emerged from the data was the importance of school administration. Because of the time and resources required for lesson study, administrative support was necessary for program success. Administrative support was commonly provided in the form of instructional coaches or substitutes to enable teachers to step outside of the classroom and focus on implementing the phases of lesson study. The identification of substitute teachers to support the lesson study process was more difficult among small rural schools where a limited number of core teachers existed for some subject areas.

Lesson study had value for teachers. Many teachers commented that the lesson study process enabled them to learn from their peers. Eighty-two percent (82.2%) of teachers in the pilot reported that lesson study impacted their professional growth, a direct aim of the program. This belief was supported by administrators who commented that the teachers "who participated in the program have become much better at lesson planning." Eighty-nine percent (88.9%) of administrators reported that lesson study impacted teachers' professional growth.

Lastly, students demonstrated growth from the lesson study process. Of the 1,260 students who directly participated in the lessons, 95 percent completed both a pre-test and post-test assessment (N = 1,203). The result of those assessments indicated that students made statistically significant gains ($p < .05$) to the pre-test scores in all three pilots. On average, the magnitude of those gains was 0.61 standard deviations

or approximately 17 percentage points. Further, most students indicated that they understood most or all of the lessons (88.5%) and enjoyed them (73.2%).

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:

- **Make expectations of the lesson study process clearer to teachers**. There seemed to be confusion about the timeline for each phase of the lesson study process. Such issues are to be expected with the implementation of any new program. Changes have been made during the pilot in response to the feedback of participants but program managers may want to focus on how details of the lesson study process are shared with participants. Some teachers suggested a checklist of weekly goals might be helpful.
- **Consider the summer or other existing structures for professional development as an option for lesson study**. The challenge of identifying time and resources for lesson study was a common theme among teachers and school administrators. One option may be to conduct elements of the lesson study process during the summer. Such an approach could minimize conflict with school calendars and potentially minimize the cost and challenges associated with substitute teachers. Alternatively, some schools may want to utilize existing structures such as professional learning communities (PLCs) for lesson study. Such an approach would also minimize conflict with the school calendar.
- **Consider teaching lessons at the beginning of a semester**. A number of teachers commented that implementing a single lesson late in the semester was problematic. Lessons delivered at the beginning of a semester may be more predictable due to natural adjustments that occur to lesson plans.
- **Consider conducting lesson study over a shorter time span**. There were a number of comments about the challenge of deeply reflecting during a 45-60 minute session at the end of the school day. Two half-day sessions of lesson study may help to shorten the duration of the lesson study process and facilitate a shorter (2–3 week) timeline.
- **Avoid TEKS that may be under review.** Teachers expressed concerns about the impact of potential changes to TEKS and if the lessons developed though the lesson study process would continue to be relevant to teachers in the future. It is not clear how program managers can anticipate those potential changes but it may be best to avoid TEKS under review.
- **Emphasize lesson study as professional development**. Lesson study served a dual purpose in that teachers participated in a professional development program that also resulted in the production of video lessons for the Texas Gateway (formerly known as Project Share). The concern is that some teachers focused more on video quality than the lesson study process. High quality videos are an asset to the program but are not the primary aim of it. This needs to be emphasized with teachers so that elements of the lesson study process can be properly prioritized.
- **Emphasize the purpose of lesson study is to create *research-based* lessons.** Some teachers and administrators expressed concern that the time dedicated to lesson study was unrealistic of lesson planning in practice. Lesson study differs from practice in that the purpose is to

collaboratively develop a *research-based* lesson. Lesson study is not intended to replace existing practices, although elements of the lesson study process may inform them. This may need to be consistently communicated with teachers so that the purpose and value of the program are clearer to participants.

- **Modify the existing parent permission form**. A number of comments were received from teachers indicating that the permission slip used with students was generic and nonspecific. This resulted in many questions from parents. Because the activities associated with the lessons may vary by subject, grade level, or class, it may be helpful for lesson study groups to provide a cover letter containing additional details of lesson study.
- **Reduce the number of required surveys**. A number of surveys were distributed to various stakeholders during the lesson study process. Some of those surveys may better suited as optional formative feedback for facilitators and teachers rather than data required for evaluation of the program. Reducing the number of required surveys might improve survey response rates and the quality of feedback.
- **Revise or refine the teacher self-efficacy scale**. Although the scores from this scale showed acceptable internal consistency, a preliminary exploratory factor analysis indicated more work may be needed to demonstrate validity of the scale. There are a number of teacher self-efficacy scales available in the literature (e.g. Friedman & Kass, 2002; Gibson, & Dembo, 1984; Skaalvik & Skaalvik, 2007) that may be a source of some guidance for program managers.
- **Consider tracking other performance measures**. The use of existing teacher evaluations may help evaluate the effectiveness of the lesson study professional development program without requiring additional surveys. For students, this may include the use of STAAR or other state and local assessments for the purpose of comparison.
- **Modify the data collection process.** Data were collected from teachers and students who did not participate in the lesson study process. The use of a comparison group is important to the evaluation of the program. The problem was that the data were collected anonymously and in some cases, pre-test survey data could not be matched to post-test survey data. This affected the analyses that could be conducted on the data. Confidentiality is important but can be maintained without anonymity. A method for linking of pre-test and post-test survey responses of all participants (and non-participants) will be necessary for the longitudinal tracking of teacher and student outcomes.

REFERENCES

Cohen, J. (1992). A power primer. *Psychological bulletin, 112*(1), 155.

Friedman, I. A., & Kass, E. (2002). Teacher self-efficacy: A classroom-organization conceptualization. *Teaching and teacher education, 18*(6), 675-686.

Gibson, S., & Dembo, M. H. (1984). Teacher efficacy: A construct validation. Journal of educational psychology, 76(4), 569.

Lewis, C. C., & Hurd, J. (2011). *Lesson study step by step: How teacher learning communities improve instruction*. Portsmouth, NH: Heinemann.

Lewis, C. C., Perry, R. R., & Hurd, J. (2009). Improving mathematics instruction through lesson study: A theoretical model and North American case. *Journal of Mathematics Teacher Education, 12*(4), 285-304.

Skaalvik, E. M., & Skaalvik, S. (2007). Dimensions of teacher self-efficacy and relations with strain factors, perceived collective teacher efficacy, and teacher burnout. *Journal of educational Psychology, 99*(3), 611.

Stepanek, J., Appel, G., Leong, M., Turner Mangan, M., & Mitchell, M. (2007). *Leading lesson study: A practical guide for teachers and facilitators*. Thousand Oaks, CA: Corwin Press.

Texas Education Agency. (2016). *Agency Strategic Plan: Fiscal years 2017–2021*. Austin, TX: Texas Education Agency.

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(2)(C)	Students are expected to orally generate rhymes in response to spoken words (e.g., "What rhymes with hat?").	1
		K(2)(D)	Students are expected to distinguish orally presented rhyming pairs of words from non-rhyming pairs.	1
1	ELA/R	1(F19)(D)	The student is expected to make inferences about text and use textual evidence to support understanding.	1
		1(17)(A)	Students are expected to plan a first draft by generating ideas for writing (e.g., drawing, sharing ideas, listing key ideas).	1
2	ELA/R	2(6)(B)	Students are expected to compare different versions of the same story in traditional and contemporary folktales with respect to their characters, settings, and plot.	1
		2(14)(C)	Students are expected to describe the order of events or ideas in a text.	1
3	ELA/R	3(4)(B)	Students are expected to use context to determine the relevant meaning of unfamiliar words or distinguish among multiple meaning words and homographs.	3
4	ELA/R	4(6)(A)	Students are expected to sequence and summarize the plot's main events and explain their influence on future events.	1
	ELA/R	4(15)(C)	Students are expected to revise drafts for coherence, organization, use of simple and compound sentences, and audience.	1
5	ELA/R	5(11)(A)	Students are expected to summarize the main ideas and supporting details in a text in ways that maintain meaning and logical order.	1
6	ELA/R	6(10)(D)	Students are expected to synthesize and make logical connections between ideas within a text and across two or three texts representing similar or different genres.	1
English I	ELA/R	E1(5)(B)	Students are expected to analyze how authors develop complex yet believable characters in works of fiction through a range of literary devices, including character foils.	1
	ELA/R	E1(F19)(B)	The student is expected to make complex inferences about text and use textual evidence to support understanding.	2
English II	ELA/R	E2(F19)(B)	The student is expected to make complex inferences about text and use textual evidence to support understanding.	1

Mathematics TEKS

Grade Level	Subject	SE	Rule Text	# of Groups
1	Math	1(1)(E	The student is expected to create and use representations to organize, record, and communicate mathematical ideas.	1
		1(3)(C)	The student is expected to compose 10 with two or more addends with and without concrete objects.	1
3	Math	3(4)(E)	The student is expected to represent multiplication facts by using a variety of approaches such as repeated addition, equal-sized groups, arrays, area models, equal jumps on a number line, and skip counting.	1
	Math	3(4)(K)	The student is expected to solve one-step and two-step problems involving multiplication and division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recall of facts.	1
	Math	3(5)(B)	The student is expected to represent and solve one- and two-step multiplication and division problems within 100 using arrays, strip diagrams, and equations.	2
	Math	3(8)(B)	The student is expected to solve one- and two-step problems using categorical data represented with a frequency table, dot plot, pictograph, or bar graph with scaled intervals	1
4	Math	4(4)(H)	The student is expected to solve with fluency one- and two-step problems involving multiplication and division, including interpreting remainders	1
5	Math	5(3)(J)	The student is expected to represent division of a unit fraction by a whole number and the division of a whole number by a unit fraction such as 1/3 ÷ 7 and 7 ÷ 1/3 using objects and pictorial models, including area models.	1
	Math	5(3)(L)	The student is expected to divide whole numbers by unit fractions and unit fractions by whole numbers.	1
	Math	5(7)	The student applies mathematical process standards to select appropriate units, strategies, and tools to solve problems involving measurement. The student is expected to solve problems by calculating conversions within a measurement system, customary or metric.	1
6	Math	6(3)(E)	The student is expected to multiply and divide positive rational numbers fluently.	1
7	Math	7(5)(C)	The student is expected to solve mathematical and real-world problems involving similar shape and scale drawings.	1
	Math	7(9)(A)	The student is expected to solve problems involving the volume of rectangular prisms, triangular prisms, rectangular pyramids, and triangular pyramids.	1
	Math	7(11)(A)	The student is expected to model and solve one-variable, two-step equations and inequalities.	1
	Math	7(11)(B)	The student is expected to write and solve equations using geometry concepts, including the sum of the angles in a triangle, and angle relationships.	1
8	Math	8(8)(C)	The student is expected to model and solve one-variable equations with variables on both sides of the equal sign that represent mathematical and real-world problems using rational number coefficients and constants.	1

Algebra I	Math	A(1)(B)	The student is expected to 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
	Math	A(2)(B)	The student is expected to write linear equations in two variables in various forms, including y = mx + b, Ax + By = C, and y - y1 = m(x - x1), given one point and the slope and given two points.	1
	Math	A(2)(C)	The student is expected to write linear equations in two variables given a table of values, a graph, and a verbal description.	1

Social Studies TEKS

Grade Level	Subject	SE	Rule Text	# of Groups
6	Social Studies	6(1)(A)	The student is expected to trace characteristics of various contemporary societies in regions that resulted from historical events or factors such as invasion, conquests, colonization, immigration, and trade.	1
	Social Studies	6(12)(A)	The student is expected to identify and give examples of governments with rule by one, few, or many.	1
8	Social Studies	8(4)(D)	The student is expected to analyze the issues of the Constitutional Convention of 1787, including the Great Compromise and the Three-Fifths Compromise.	1
	Social Studies	8(15)(D)	The student is expected to analyze how the U.S. Constitution reflects the principles of limited government, republicanism, checks and balances, federalism, separation of powers, popular sovereignty, and individual rights.	1
	Social Studies	8(19)(A)	The student is expected to define and give examples of unalienable rights.	1
	Social Studies	8(19)(B)	The student is expected to summarize rights guaranteed in the Bill of Rights.	1
	Social Studies	8(19)(C)	The student is expected to explain the importance of personal responsibilities, including accepting responsibility for one's behavior and supporting one's family.	1
	Social Studies	8(19)(D)	The student is expected to identify examples of responsible citizenship, including obeying rules and laws, staying informed on public issues, voting, and serving on juries.	1
	Social Studies	8(19)(F)	The student is expected to explain how the rights and responsibilities of U.S. citizens reflect our national identity.	1
	Social Studies	8(21)(B)	The student is expected to describe the importance of free speech and press in a constitutional republic.	1
	Social Studies	8(21)(C)	The student is expected to summarize a historical event in which compromise resulted in a peaceful resolution.	1

Science TEKS

Grade Level	Subject	SE	Rule Text	# of Groups
5	Science	5(2)(D)	The student is expected to analyze and interpret information to construct reasonable explanations from direct (observable) and indirect (inferred) evidence.	1
	Science	5(6)(A)	The student is expected to explore the uses of energy, including mechanical, light, thermal, electrical, and sound energy.	1
6	Science	6(8)(D)	The student is expected to measure and graph changes in motion.	1
8	Science	8(6)(B)	The student is expected to differentiate between speed, velocity, and acceleration.	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.

Teacher Reflection Survey

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

1. Who is your outside facilitator?
2. I understood the objectives for today's meeting.
3. I was given the opportunity to share my ideas.
4. The outside facilitator was prepared, open to our ideas and encouraged discussion.
5. The meeting moved at a productive pace.
6. The information discussed today will lead to improved student outcomes.

Teacher Participant Survey

1. Which part of the Lesson Study process did you find the most beneficial? Why?
2. Which part of the Lesson Study process did you find most challenging? Why?
3. Participating in Lesson Study has impacted student growth. (Likert Scale: Strongly Disagree to Strongly Agree)
4. Participating in Lesson Study has impacted my professional growth. (Likert Scale: Strongly Disagree to Strongly Agree)
5. What changes to the Lesson Study Pilot Program would you recommend for next year?
6. Did you have sufficient time to go through the Lesson Study Process?
7. Which section of the Lesson Proposal was the most beneficial in your teaching practice? Why?
8. 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)
9. I would like to go through the Lesson Study process again. (Likert Scale: Strongly Disagree to Strongly Agree)
10. Would you participate in Lesson study again without receiving a stipend? Why or why not?

Administrator Survey

1. How did participation in the Lesson Study process impact your teachers?
2. What changes to the Lesson Study Pilot Program would you recommend for next year?

3. Were you able to sit in on any of the Lesson Study Sessions?
    a. If so, how would you describe the discussions taking place?
    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?
7. If teacher had to meet after school for the Lesson Study meetings, would you be willing to adjust the school day schedule next year to build in time for Lesson Study meetings? Why or why not?
8. The designed lesson is aligned to the T-TESS framework. (Likert Scale: Strongly Disagree to Strongly Agree)

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. (Likert Scale: Strongly Disagree to Strongly Agree)
4. Today's lesson seemed the _____ what we normally do in class.
    a. Different than
    b. Same as

Student Interview

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 were being taught to another class, what would you change? Why would you change that aspect?