

**Race to the Top and Lesson Study Implementation in Florida:
District Policy and Leadership for Teacher Professional Development**

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Structured Abstract

Purpose: Lesson study was introduced to Florida districts as part of the Race to the Top (RTTT) Program in 2010 as an innovative approach to teacher professional development. The purposes of this study are to examine: 1) the variation and change in the level of lesson study implementation across 58 Florida school districts, 2) district policies and leadership practices associated with the level of lesson study implementation, and 3) approaches taken by the districts to achieve a districtwide implementation of lesson study.

Research Methods/Approach: This mixed methods study conducted statewide surveys of 58 district representatives and interviews of 3 district leaders who implemented lesson study districtwide.

Findings: The survey data analysis revealed that the districts that required schools to practice lesson study, provided funding for substitutes and teacher payment, and had a future sustainability plan were more likely to report a higher level of lesson study implementation and sustained implementation even after the RTTT ended. The interviews revealed that these district leaders first internalized lesson study through communicating a districtwide expectation of job-embedded inquiry-based professional development and providing funding to meet this expectation. Then, they promoted institutionalization of lesson study by supporting school ownership and leadership in organizing and embedding lesson study into the school organizational structures and routines.

Implications for Research and Practice: Districts' coherent expectation for professional learning, funding provision, and sustainability plan are necessary for a districtwide implementation of teacher-driven, collaborative, and inquiry-based professional development such as lesson study.

Keywords: Race to the top program, teacher professional development, lesson study, mixed methods study, district policy and leadership

Article Type: Empirical paper

Introduction

With implementation of the Common Core State Standards (CCSS) in many states since 2014, it became urgent that instruction provided across the country ensure students' opportunity to master necessary knowledge and skills to become successful in our society. Teacher professional development plays a critical role because effective teacher learning is essential for enacting ambitious instruction envisioned in the CCSS, which is still experientially unfamiliar to many teachers (Marrongelle, Sztajn, & Smith, 2013).

Lesson study is one of the approaches to teacher learning which builds on core principles of teacher ownership, collaboration, and inquiry into teaching and student learning in a chosen subject topic (Hart, Alston, & Murata, 2011; Lewis, 2002; Lewis & Hurd, 2011). It originated in Japan where lesson study is institutionalized and universally practiced, and it was imported to the U.S. in late 1990s after the publication of *Teaching Gap* (Stigler & Hiebert, 1999). This comparative video study of mathematics instruction as part of the 1995 Trends in International Mathematics and Science Study (TIMSS) identified lesson study as the driving force for Japanese teachers' student-centered problem-solving instruction that promotes conceptual understanding—a type of ambitious instruction promoted by CCSS. Since then, lesson study has been practiced by an increasing number of teacher groups, schools, and districts across the United States (Lewis, Perry, Hurd, and O'Connell, 2006; Perry & Lewis, 2010).

Florida is the first state that promoted lesson study as a statewide model of professional development using part of the US\$700 million Race to the Top (RTTT) funding they received in 2010 (FLDOE, 2010a). The current study focuses on the district implementation of lesson study across the state of Florida. School districts select, mandate, finance, and facilitate teacher professional development, serving as a driver for districtwide improvement of instruction and

student learning (Coburn & Russell, 2008; Elmore & Burney, 1999; Firestone, Mangin, Martinez, & Polovsky, 2005; Floden, et al., 1988; Gamoran, et al., 2003; Hightower, Knapp, Marsh, & McLaughlin, 2002; Knapp, 2003; Little, 1989; 1993; Spillane, 1996; Stein & D'Amico, 2002; Stein & Coburn, 2008; Sykes, O'Day, & Ford, 2009). There is a need to better understand what district policy and leadership practices lead to a districtwide implementation of a promising professional development approach such as lesson study, and how the districts sustain the implementation after the RTTT program ended.

To examine the characteristics of district policies and leadership practices associated with the level of lesson study implementation, we conducted a mixed methods study of a statewide survey and interviews of district professional development directors in 2014 and 2015. Conducting the survey in these two years allowed us to consider the possible impacts of federal funding through the RTTT program that ended in 2014, and identify factors that allowed some districts to sustain lesson study after the RTTT program. Considering the fact that many top-down reform initiatives do not sustain in many schools after the program and funding end (Datnow, 2005; Fink, 2000; Giles & Hargreaves, 2006; McLaughlin & Mitra, 2001), understanding what led some districts to sustain lesson study initiated by the Florida RTTT program will provide important leadership and policy implications.

Specifically, this study addressed the following questions:

1. What variation exists in the level of lesson study implementation across 58 Florida school districts and how did the implementation level change after the RTTT program ended?
2. What district-level policies and leadership practices are associated with the level of lesson study implementation?
3. How did district leaders approach lesson study to achieve a districtwide implementation?

This study is unique in several aspects. First, its focus on lesson study—a teacher-driven, collaborative, and inquiry-based professional learning process—is different from the majority of other policy implementation studies that focused on externally developed reform initiatives that were proven effective in controlled settings. Challenges of implementing, sustaining, and scaling up “external” reform initiatives have been well documented in previous studies (Coburn, 2003; McLaughlin & Mitra, 2001). Lesson study’s core principle of teacher ownership may be best suited for promoting a bottom-up approach to spread and sustain the reform-based professional development program.

Second, most district studies on teacher professional development are qualitative studies that described how one or a small number of districts implemented a reform-based professional development model without detailed data on what differentiated these districts from other districts. Identification of district characteristics and approaches requires an examination of a large number of districts, and this study is the only study that gathered such data based on a statewide survey of district leaders. In addition, the use of interview data to interpret the quantitative findings allowed the researchers to examine district leaders’ motivation and rationales behind making various district-level decisions and how these decisions contributed to implementing lesson study districtwide.

Finally, the unique reform context of Florida allowed the researchers to study district-level variations in policies and leadership practices to promote lesson study. Lesson study was introduced as a reform-based professional development statewide with federal RTTT funding but with limited state-level requirement and oversight (Author, 2016). This allowed districts’ discretion and autonomy as to whether or not to implement and sustain lesson study during and beyond the four-year period of the RTTT program from 2010 through 2014. This context led to a

major variation across the state in the level of lesson study implementation, serving as an ideal site for examining the district policies and leadership practices that could explain the variation through statewide surveys. The current study produces important policy implications to inform states' and districts' effort to achieve system-level instructional improvement using a reform-based professional development implemented districtwide.

Background

Implementing Lesson Study

In lesson study, a group of teachers engage in four stages of: 1) studying the curriculum and student understanding in a chosen topic—a topic their students struggle the most—and setting a student learning goal, 2) developing a lesson plan that anticipates student responses and learning, 3) teaching the lesson in a classroom of one group member while other members gather the data on student responses and thinking processes (this lesson is called research lesson), and 4) discussing the effectiveness of the lesson in promoting student learning (Hart et al., 2011; Lewis, 2002; Lewis & Hurd, 2011). These stages allow teachers to collaboratively examine and reflect on their beliefs and assumptions about student learning, and identify the elements of instruction that promote student learning based on the data collected from their own students during the research lesson.

The evidence on the effectiveness of lesson study based on experimental studies is limited because of its very nature as a teacher-driven process, which produces natural variations in the lesson study process across groups and difficulty of randomly assigning teachers to experimental and control groups. The only available experimental study was conducted by Lewis and Perry (2014) in a randomized field trial of 39 lesson study groups across the United

States. They found that the teachers in experimental lesson study groups who were supported by rich mathematics resources on fractions—mathematical tasks, curriculum materials, lesson videos and plans, research articles, and protocols to support lesson study—improved their knowledge of fractions significantly more than the teachers in control lesson study groups without mathematics resources and the teachers who did not participate in lesson study. Positive effects of lesson study on teachers and students were also reported based on teacher perceptions and comparison of student achievement between lesson study group members’ classrooms and other classrooms (Lewis, et al, 2006; Perry & Lewis, 2010).

There are two characteristics of lesson study that distinguish itself from other existing reform-based professional development, and that have important implications for its potential to promote instructional improvement districtwide. First, lesson study is a process that builds a professional knowledge base for teaching from practitioner knowledge through practice-based research rather than simply from researchers’ external knowledge (Hiebert, Gallimore, & Stigler, 2002; Lewis, Perry, & Murata, 2006). A group of teachers builds professional knowledge through studying the curriculum and their own students’ thinking processes and understanding based on both internal and external knowledge resources, experimenting a research lesson, and gathering observation data on students’ responses to instructional approaches as evidence of effectiveness for deepening students’ understanding (Hart et al., 2011; Lewis, 2002; Lewis & Hurd, 2011). This inquiry-based research process not only brings practitioner knowledge and research knowledge together, but also refines researchers’ external knowledge in a way that can be used in diverse classroom settings (Perry & Lewis, 2010)—an important condition for a systemwide instructional improvement (Bryk, 2015; Bryk, Gomez, Grunow, & LeMahieu, 2015).

Second, lesson study provides an opportunity to develop a shared vision of ambitious instruction among teachers, school and district leaders, and policymakers through observations of research lessons (Author, 2016; Lewis, 2015). A major challenge with implementing the CCSS is that many key system actors—teachers, principals, coaches, district leaders, and policymakers do not share a clear vision of what ambitious instruction looks like in various classroom contexts because many of them are not experientially familiar with it. When a research lesson is shared publicly along with a detailed lesson plan with specific learning goals aligned with the CCSS, instructional approaches, and anticipated student responses, it creates an opportunity to discuss their beliefs and assumptions of effective instruction and student learning based on the observed research lesson and to develop a shared vision of ambitious instruction in various classroom contexts. Having a shared vision is a critical condition for building coherent policy and organizational conditions for promoting a systemwide instructional improvement (Bryk, 2015; Bryk et al., 2015; Lewis, 2015).

Examining the district policies and leadership practices associated with the level of lesson study implementation is the first step toward understanding the district-level conditions necessary for building a professional knowledge base from practitioner knowledge, and a shared vision of ambitious instruction across system actors to achieve instructional improvement districtwide.

Previous Studies on District Professional Development

Previous research on district leadership for professional development suggest that three domains of factors could influence the implementation level of lesson study: 1) district policy on lesson study, 2) funding allocation, and 3) district professional development leadership (Coburn, 2003; Firestone et al., 2005; Knapp, 2003; McLaughlin & Mitra, 2001; Perry & Lewis, 2009; 2010).

First, given the discretion and autonomy given to districts whether and how to implement lesson study, district policy that requires lesson study would likely influence the level of lesson study implementation. District “mandate” is an important policy instrument for communicating the district priority in professional development (Knapp, 2003). The district leaders may also use a policy to communicate the district vision and establish coherence in professional development (Firestone et al., 2005). Based on a comparison of three urban districts, Firestone et al. (2005) found that the district with a clear vision and emphasis on professional development implemented coherent and content-focused professional development, and the teachers in the district reported a greater influence on teaching practice. We hypothesize that the districts that require all schools to implement lesson study as a district priority would be more likely to report a higher level of lesson study implementation.

Second, districts’ continued provision of funding in the forms of substitutes and stipends for teachers is a critical condition for supporting instructional improvement (Coburn, 2003; McLaughlin & Mitra, 2001). The importance of funding for districts to provide high-quality professional development was also identified in previous empirical studies (Authors, 2015; Desimone, Porter, Birman, Garet, & Yoon, 2002; Gamoran, 2003; Spillane & Thompson, 1997). Considering the heavy teaching load of U.S. teachers compared to that of teachers in other countries (Authors, 2009), provision of substitutes for planning meetings and research lessons during the regular school hours, and extra payment for meeting outside the regular school hours would serve as major financial incentives for teachers to engage in lesson study (Murata, 2011; Yoshida, 2012). We hypothesize that the districts that provide substitute funding and teacher payment are more likely to report a higher level of lesson study implementation.

Finally, district leadership in promoting lesson study would play an important role for implementing lesson study districtwide (Perry & Lewis, 2009; 2010). Having a designated position in charge of lesson study at the district level would ensure that ongoing support be provided to schools and teachers. Stability in professional development leadership position would be also important for providing continued support of lesson study, as previous studies have documented the detrimental effects of leadership turnover on sustaining and scaling reform initiatives (Hargreaves & Fink, 2003; McLaughlin & Mitra, 2001). In addition, district leaders' future plan to sustain their support of lesson study would likely send a coherent message to school leaders and teachers that lesson study is a district priority (Firestone, et al., 2005), and likely draw their commitment to practice lesson study. Therefore, we hypothesize that the districts with a designated position for lesson study, stable professional development leadership, and a future sustainability plan to continuously support lesson study would be more likely to report a higher level of lesson study implementation.

In addition to these research on district leadership for professional development, a body of research on scaling up a reform initiative provides important insights into districtwide implementation of a professional development model (Coburn, 2003; Dede, Honan, & Peter, 2005; McLaughlin & Mitra, 2001). A synthesis of findings from cases of districts and schools that successfully scaled up educational innovations conducted by Dede and Honan (2005) identified four key factors to promote and support scaling up improvement at a system level: 1) coping with changes in context, leadership and funding, 2) promoting ownership by valuing constituent input and support, 3) building human capacity, and 4) engaging in effective decision making by interpreting data and creating and applying usable knowledge. Based on an examination of three reform efforts that are based on promising theories of learning and

instruction—Fostering a Community of Learners, Schools for Thought, and the Child Development Project, McLaughlin and Mitra (2001) pointed out a critical importance of building reform-centered knowledge and leadership capacity within the many levels of the school system so that schools and districts can adhere to core principles even if materials and practices may be adjusted to the local contexts. These studies showed that “adaptation” of an innovation is a natural part of scaling up across diverse contexts with different resources, and point to the importance of ownership and capacity building so that schools and districts can effectively adapt the innovation without altering the core principles that lead to improved instruction and student learning.

Florida Context

Lesson study was first introduced to the Florida Department of Education (FLDOE) by the Chancellor of Public Schools who visited Japan around 2008 (Authors, 2016). When the U.S. Department of Education announced the RTTT Program in 2009, FLDOE included lesson study as one of the 13 projects¹ in its RTTT application submitted in 2010 (FLDOE, 2010a). In the same year, FLDOE was awarded US\$700 million and invited all 72 districts (67 regular districts, four university lab schools, and one virtual school) to submit a proposal using a state-provided template to receive part of the RTTT funding. A total of 65 districts (90% of 72 districts) submitted a proposal in late 2010 describing their 4-year plans to implement the 13 projects and budget request. All the district proposals were approved and these 65 districts received a total of approximately US\$350 million in 2011 to implement the 13 projects (FLDOE, n.d.-a).

The district proposal template for “Project 1: Expand Lesson Study” prepared by FLDOE included a state policy and a compliance procedure (FLDOE, 2010b). The policy states “A local

education agency (LEA) with a Persistently Lowest Achieving (PLA) school will modify these schools' schedules to devote a minimum of one lesson study per month for each grade level or subject area," and specified four deliverables that LEAs with at least one PLA school are required to submit annually (FLDOE, 2010b, p. 6): (a) school schedule in each PLA school that includes regularly scheduled blocks of time dedicated to lesson study for each grade level or subject area, (b) rosters of lesson study participants, (c) lesson plans used for lesson study, and (d) one improved lesson plan as a result of lesson study. The proposal template further specified the importance of sustainability by asking the districts to provide "a short description or list of factors that will contribute to the sustainability of the results of this Project (lesson study) after Race to the Top funding ends." (FLDOE, 2010b, p7).

FLDOE specified a total of 71 schools in 25 districts as PLA schools in the 2010-2011 academic year and explained that this list would not change during the 4-year grant period for purposes of the RTTT program (FLDOE, n.d.-b). Of these 25 districts, 23 districts participated in the RTTT program, thus the FLDOE requirement applied to 66 schools in these 23 districts. These schools constitute only 2% of the total of 3,450 schools in 67 regular districts across Florida, thus the state policy scope was quite limited. Despite the limited scope of the state policy, lesson study has spread across the state, and statewide surveys of district leaders reported that 668 schools across 46 districts practiced lesson study in 2014 (19% of Florida schools), and 749 schools across 39 districts (22% of Florida schools) did so in 2015 (Authors, 2016).

A previous mixed methods study conducted in 2013 revealed major challenges with implementing this international innovation within different districts' organizational structures and routines of teacher professional development (Authors, 2016). The authors found that many districts requested limited funding for lesson study due to the lack of awareness of time-intensive

nature of lesson study. The district survey data showed that only 12 districts requested RTTT funding for lesson study, and only 23 districts and seven districts provided funding for substitutes and teacher payment respectively—two types of funding critical for lesson study implementation (Murata, 2011; Yoshida, 2012). As a result, many districts promoted short-term and adds-on approaches to lesson study. Yet, this study also observed a major variation across districts in using various policy instruments—mandates, inducements (funding), and capacity building to promote lesson study. Such a variation allows an examination of district policy and approaches that could lead to a districtwide practice of lesson study as a driving force for a large-scale instructional improvement.

Methods

Statewide District Survey

A statewide district survey named “Lesson Study District Survey” was conducted via the Qualtrics online survey tool between May and August in 2014 and 2015. These two years were selected for two purposes: 1) to examine the difference in the implementation level of lesson study within districts before and after the RTTT program ended, and 2) to examine the differences in the district characteristics associated with the implementation level before and after the RTTT program ended. In both years, we followed the three stages of survey implementation: 1) identification of the district representative who is in charge of lesson study implementation in each district through web searches, emails and phone calls, 2) administration of the online survey, and 3) follow ups with non-respondents through emails and phone calls. Of the total of 72 Florida districts, we decided to focus on 68 districts (67 regular districts and a virtual school district)² and reached out to the district professional development directors first by

emails and phone calls to identify the individuals who are in charge of lesson study implementation at the district level. Of the 68 districts in 2014, the district staff in charge of lesson study were professional development coordinators in 36 districts (53%), curriculum or assessment directors in 13 districts (19%), superintendents or assistant superintendents in 7 districts (10%), other district level directors (e.g., Director of school leadership, Director of secondary education, Human resource director) in 6 districts (9%), federal program coordinators in 4 districts (6%), and coaches and teacher leaders in assignment in 2 districts (3%). Of the 68 districts in 2015, the district staff in charge of lesson study were professional development coordinators in 39 districts (57%), curriculum or assessment directors in 15 districts (22%), superintendents or assistant superintendents in 6 districts (9%), other district level directors in 5 districts (7%), federal program coordinators in 2 districts (3%), and teacher leaders in assignment in 1 district (1%). Then we sent out a survey invitation email with a link to the online Lesson Study District Survey.

In both years, the survey first defined lesson study as “a continuous professional development process that involves a group of 3-6 teachers collectively engaging in four stages: 1) goal setting, 2) lesson planning, 3) research lesson, and 4) debriefing session.” The survey included questions on seven major topics: 1) district policy on lesson study—the number and types of schools required to practice lesson study, 2) number of schools that practiced lesson study including both required and volunteered schools, 3) funding provision for substitutes and teacher stipends, 4) district-level designated position for promoting lesson study, 5) future plan to continue the district support of lesson study in the following year, 6) other professional development programs implemented, and 7) open-ended comments about their experience with lesson study. In 2014, in addition to these survey items, the information on district trainings on

lesson study, modification of school schedules to accommodate lesson study, and the use of lesson study for teacher evaluation were included.

The survey participants received a link to a \$25 online gift card of a major retailer upon completion in 2014 as an incentive. In 2015, participants received \$20 online gift card.³ After multiple emails and follow-up phone calls, as of August, 58 districts participated in each of the 2014 and 2015 surveys with a response rate of 85%. Of these 58 districts, 53 districts participated in both 2014 and 2015 survey (5 other districts in each year participated only in one year).

The online Appendix A presents the background characteristics of these 58 districts compared with those of 68 districts in the population. The similarities in the characteristics – student enrollment size, poverty level measured by the percentage of students with free or reduced price lunch, ethnic diversity level measured by the percentage of ethnic minority students, and achievement level measured by the percentage of students meeting proficient level or above in the Florida standardized assessment – between the surveyed districts and the population support the likely generalizability of the study findings to the population.

Variables

This study analyzed the implementation level of lesson study as the dependent variable and three domains of district characteristics as independent variables.

Lesson study implementation. The professional development directors (or other district personnel in charge of lesson study) were asked in the survey, “How many schools in total practiced lesson study in your district during the 2013-2014 (2014-2015) academic year? Please include both the required schools and the schools that voluntarily practiced lesson study.” In order to validate the accuracy of the reported number, we gathered additional information

through interviews and documents from the 34 district respondents who reported that at least one school practiced lesson study during the 2014-15 and/or 2015-16 academic years in the survey.

First, we invited all 34 district respondents to participate in a brief follow-up interview to validate whether the practice they reported followed the core principles of lesson study – teacher-driven, collaborative, and inquiry-based professional learning process that involved a research lesson. A total of 21 survey respondents agreed to participate in the interview during which we asked them to explain the process of lesson study practiced in the district including: 1) who facilitates lesson study, 2) how are lesson study meetings scheduled, 3) what materials and data are used to studying student understanding and planning a research lesson, 4) how are lesson study participants invited, 5) who teaches the research lesson to which classroom, 6) how the team observes the research lesson and collects data, and 7) how the debrief session is organized.

Second, we gathered the district documents on lesson study from the survey respondents and/or the district website from the remaining 13 districts that could not participate in the interview. These documents were reviewed and coded based on the same seven questions used in the interview, and a summary document was developed for each district. Based on these interviews and document analysis, we concluded that all 34 districts except one in both years promoted lesson study in a way that follows the core principles of teacher-driven process (which promotes ownership), collaboration, and inquiry into teaching and student learning. One district was found to be promoting lesson study that does not involve research lesson, thus their survey response on the number of schools practicing lesson study was revised to 0.

Based on the number of schools reported in the survey, we computed the percentage of schools that practiced lesson study by dividing the number by the total number of regular schools in the district as the district level of lesson study implementation.

District policy. For the scope of lesson study requirement during the preceding year (2013-14 and 2014-15), the district professional development directors were asked to choose from three options: 1=no school was required, 2=only some schools (e.g. PLA or low-achieving schools) were required, and 3=all schools in the district were required.

Funding allocation. The district professional development directors were asked whether they provided funding for: (1) substitutes for teachers to participate in lesson study, and (2) stipends for teachers who participate in lesson study outside the regular school hours. Their responses were coded as 1=yes and 0=no.

District leadership. Three variables were developed to measure the characteristics of district leadership: (1) designated position for lesson study, (2) professional development director stability, and (3) future sustainability plan. The survey respondents were asked, “Did your district have a designated facilitator or coordinator at the district level whose main responsibility was to facilitate lesson study during the 2013-14 (or 2014-2015) academic year?” and their responses were coded as 1=yes and 0=no. To measure the professional development director stability, we examined if there was a turnover in the position from 2013 to 2014 and from 2014 to 2015 based on the information from the district websites or email/phone communications. The districts which had the same director were coded as 1 and the district which had two different directors from one year to the next were coded as 0. To measure future sustainability plan, the survey participants were asked, “Does your district have a plan to continue to support lesson study during the 2014-15 (or 2015-2016) academic year?” Their responses were coded as 1=yes and 0=no.

Interviews of Districts with a High Level of Lesson Study Implementation

To address the third research question, “How did district leaders approach lesson study to achieve a districtwide implementation?” we identified seven districts where the district leaders reported at least 90% of schools practiced lesson study, and we validated that their lesson study practice followed the core principles. We decided to focus on the districts that implemented lesson study districtwide in order to understand district leaders’ motivation and rationales behind making various district-level decisions and how these decisions contributed to implementing lesson study districtwide and sustained the high level of implementation even after the RTTT program ended.

Three of these seven districts were excluded as they were small rural districts enrolling less than 3,000 students – significantly smaller than the average Florida districts that enroll 38 to 40,000 students. The findings from these districts in these rural contexts are not generalizable to a majority of other districts. Of the other 4 other districts, professional development directors in 3 districts – Albany, Morison, and Lester (pseudonyms) – agreed to participate in the interview. In 2015, Albany had an enrollment of 29,000 with 47% of students receiving free or reduced-price lunch (FRL) and 56% of students identifying as ethnic minority students. Morison enrolled approximately 8,000 students, 47% of whom received FRL and 52% ethnic minorities. Lester is the smallest, enrolling approximately 5,000 students, and 61% FRL students, and 29% ethnic minority students. Albany and Morison received the achievement grade of A and Lester received B in 2015 based on the district average scores in the state assessment.

The interviews were conducted in fall 2015 with three professional development directors who participated in the statewide survey. During the semi-structured interviews, the researchers asked a list of questions grouped into four domains: 1) influence of RTTT and district policy, 2)

lesson study approach, 3) funding, and 4) sustainability and changes. The interviews lasted from 40 minutes to one hour, which were transcribed verbatim for data analysis.

Data Analysis

To address the first question on the implementation level of lesson study, descriptive statistics and frequencies were computed. For the second research question on the relationship between district policy and leadership practice and the level of lesson study implementation, we first presented descriptive statistics on district policy and leadership practice for promoting lesson study, and then we conducted correlation, t-test, or ANOVA depending on the numerical nature of the variables (continuous, ordinal or nominal). Due to the small sample size of 58 or less, we conducted only bivariate analyses.

To address the last question on how district leaders approached implementing lesson study districtwide, we created a district profile for each district summarizing the survey responses from 2014 and 2015 and the content of the RTTT district proposal, and coded the interview transcripts. The coding occurred at multiple phases. In the first phase, four researchers marked the interview transcripts for broader terms, such as RTTT, policy, lesson study approach, funding, and sustainability plan. After the transcripts were coded for these broad categories, for the second phase of coding, we coded them using more specific subcategories, that were district expectation, coaches' roles, lesson study templates, principal roles, teacher buy-in, securing funding from multiple sources, embedding lesson study, and lesson study as self-sustaining process. The coding at the first and second phases were discussed extensively among the four researchers to refine and finalize the subcategories. At this point, the subcategories were referenced back to the survey data for their relevance to the patterns emerging from the analysis, to maintain coherence across the data analysis processes. In the final phase of the analysis, these

refined codes were synthesized to identify common themes across the three cases, which were internalization, teacher professional development expectation, school ownership of lesson study process, and institutionalization. These common themes provided additional contextual explanations and examples to the findings from surveys, to answer our research questions.

Results

District Level of Lesson Study Implementation

Figure 1 presents the descriptive statistics and frequencies of the level of lesson study implementation among 53 districts that participated both in 2014 and 2015 surveys in order to examine the changes in the implementation level.⁴ The original data were continuous ranging from 0 to 100%, and we present the distribution in five categories here to visually present the changes from 2014 to 2015 before and after the RTTT program ended.

We expected that the level of implementation would dramatically decline when the RTTT funding ended. However, the mean implementation level measured by the percentage of schools within districts that practiced lesson study did not change much from 2014 to 2015 (35.4% to 34.2%). The figure shows, however, that the distribution of the lesson study implementation level across 58 districts slightly changed from 2014 to 2015. As expected, the percentage of districts that stopped practicing or never practiced lesson study has increased from 20.8% to 35.8%. Yet, the percentage of districts with a high implementation level (76-100%) also increased from 18.9 to 22.6%. Thus, we can see a trend of bifurcation in the district level of lesson study implementation after the RTTT program ended.

[Figure 1]

District Policy and Practice in Promoting Lesson Study

Before examining the second research question on the district policy and leadership practices associated with the level of lesson study implementation, we examined the variation in the district policy and leadership practices across 58 districts in 2014 and 2015. Given the limited state requirement on lesson study, district leaders exercised their discretion in establishing policy and leadership practices for promoting lesson study in their schools. Table 1 presents the descriptive statistics of district policy and leadership practice in promoting lesson study reported in 2014 and 2015 surveys along with the district background characteristics and the districts' RTTT participation.

[Table 1]

The descriptive statistics of the district background characteristics show that there are major variations in the size, poverty level, diversity level, and achievement level across these districts. Of the 58 districts that participated in the survey in 2014 and 2015, the district RTTT proposals were available from 52 districts. Among the 52 districts, about half specifically proposed implementation of lesson study in their 2010 district proposals to obtain RTTT funding and 37% of these districts had at least one PLA school that was required by FLDOE to practice lesson study until 2014. The mean funding amount on lesson study the districts received in 2010 at the beginning of the RTTT program was about \$70-80,000. The mean total amount of RTTT funding they received in 2010 was \$4 million among the 52 districts that participated in our 2014 survey, and \$6 million among the 52 districts that participated in our 2015 survey.

The district policy on lesson study plays an important role in scaling up lesson study. In 2014, 58.6% of the districts did not require any school, 24.0% required only some schools, and 17.2% required all schools to practice lesson study. In 2015, 74.1% of the districts did not

require any school, 10.3% required only some schools, and 15.5% required all schools to practice lesson study (means of these three levels are presented in Table 1). Thus there was a major decline in the district policy to require lesson study after the RTTT program ended in 2014 from 41.2% of districts in 2014 to only 25.8% of districts in 2015.

District funding allocation is a critical part of scaling up lesson study considering the limited time available during the regular school hours for teachers to engage in professional development activities. The survey data showed that in 2014, 45% of the districts provided funding for substitutes to participate in lesson study meetings and 14% of the districts provided funding for teacher payment for meeting outside the regular school hours. In 2015, the percentage of districts providing substitute funding decreased to 36%, yet the percentage providing teacher payment increased to 22%. In both years, less than half of the districts provided funding for lesson study.

District leadership characteristics also play an important role in implementing lesson study especially after the RTTT funding ended. The percentage of districts with a designated position to facilitate lesson study decreased from 53% to 24% from 2014 to 2015. These positions may have been funded by the RTTT program, which were eliminated when the funding ended. Stability of the professional development director is also critical as turnover in the position who oversees lesson study could affect the continued effort to implement lesson study districtwide. From the 2012-2013 year to the 2013-2014 academic year, the same individuals served as the directors in 64% of the districts. From the 2013-2014 to 2014-2015 academic year, 74% of the districts had the same directors. Finally, the director's plan to sustain support for lesson study in the following year shows the district's long-term commitment to lesson study. In 2014, 59% of the professional development directors reported that they plan to continue their

support during the 2014-2015 academic year, and in 2015, 62% of the directors reported their continued support during the 2015-2016 academic year. A slight increase in the future sustainability plan is unexpected considering the decline in the percentage of districts with a lesson study requirement, funding allocation, and a designated position from 2014 to 2015.

District Policy and Practice Associated with the Level of Lesson Study Implementation

Before we examined the relationship between district policy and practice associated with the level of lesson study implementation, we examined how district background characteristics and state influence via RTTT participation are associated with the district level of lesson study implementation. Correlation and t-test analyses showed that none of these factors were significantly associated with the level of lesson study implementation (Results available in online Appendix B and C). This indicates that the state influence through RTTT program on districts' efforts to implement lesson study districtwide seems to be limited even during the 2013-2014 academic year before the program officially ended.

Table 2 presents ANOVA and t-test results on the relationship between three domains of district factors (District policy, funding allocation, and district leadership) and the level of lesson study implementation measured by the percentage of schools that practiced lesson study in each district (a continuous variable ranging from 0 to 100%). The table shows that four types of variables are significantly associated with the level of lesson study implementation. First, the districts that required all schools to practice lesson study are significantly more likely than the districts that did not require any school or required only some schools to report a higher level of lesson study implementation. Expectedly, district policy has a major influence on the level of lesson study implementation. Second, the districts that provided substitute funding were more likely to report a higher level of lesson study implementation in 2014, and the districts that

provided teacher payment are more likely to do the same in 2015. Finally, district professional development directors' future sustainability plan to continue to support lesson study was significantly associated with the level of lesson study implementation in both years.

Unexpectedly, having a designated position for lesson study and the stability of professional development directors were not significantly associated with the level of lesson study implementation reported by the district leaders.

[Table 2]

To better understand the approaches the districts have taken to implement lesson study districtwide, importance of these significant factors, and some possible reasons for the lack of significant relationship between the level of lesson study implementation and some district factors, we conducted interviews with three district professional development directors in the districts that implemented lesson study in over 90% of the schools. In the following sections, we will present the findings from the interview analysis, to contextualize the lesson study effort in these districts.

RTTT Introduction of Lesson Study, Internalization, and Institutionalization

The interviews with three professional development directors—Ms. Clark in Albany, Ms. Anderson in Morison, and Mr. Wallace in Lester (pseudonyms)—revealed the processes these districts went through in implementing lesson study. The data show that, after lesson study was introduced by FLDOE, the districts internalized it through a districtwide expectation and funding, and promoted institutionalization of lesson study by respecting and supporting school ownership and leadership in organizing lesson study and embedding it as part of the organizational routines.

State influence via RTTT participation. All three professional development directors shared that the district started lesson study because of the RTTT program. A review of the district RTTT proposals showed that Albany had two PLA schools and Lester had one PLA school, and both districts submitted a lesson study implementation plan to FLDOE in their RTTT district proposals. Albany, however, did not request funding for lesson study and instead reported that they would use funding from the School Improvement Grant (SIG)⁵. Morison did not have any PLA school, so no funding was requested for lesson study in their proposal.

Despite the state initiative in introducing lesson study to these districts, these directors were not aware which PLA schools were required by FLDOE to implement lesson study nor could they recall the content of the RTTT district proposals. It could be due to the time lapse and personnel changes—it was five years ago when these proposals were submitted. However, none of these directors seem to see the FLDOE’s role or RTTT program to be important beyond the initial involvement in introducing lesson study. When asked about the influence of the RTTT program, Mr. Wallace said, “Oh well, it was more of a formal process, with the documentation of lesson study.” It was clear that in all of these three districts, the directors did not see RTTT to be influential in their decision or approaches to promote and implement lesson study. These accounts of the directors support the finding that none of the four indicators of districts’ participation in the RTTT was significantly associated with the level of lesson study implementation.

Internalizing lesson study through expectation and funding support. The survey responses of these directors showed that all schools are required to practice lesson study in their districts. The interviews revealed the decision-making processes the districts took over the years. Ms. Clark in Albany explained:

We have an expectation of job-embedded professional development, and I think we need to keep that expectation in place. You know, this is one of the few things that we do in our districts...as a district, we expect you to, you know, to do something like lesson study. And so, I think that's a major benefit because every school does it to some extent. Later Ms. Clark explained that lesson study is the only professional development that the district expects all teachers to be part of, and 20% of the teacher evaluation is devoted to teacher participation in lesson study through self-assessments of lesson plan, research lesson, observation and debriefing, reflection, and perceived improvement.

Ms. Anderson in Morison explained the rationale behind the expectation that all schools do one cycle of lesson study a semester,

That's considered best practice....the way the process works here is professional learning communities are supposed to look at areas of student achievement that need to be supported. So, usually when they decided on an area that needs support, then they do their research, but usually it comes down to classroom practices need to be changed. So that's where lesson study comes in, because they located a problem; they researched that problem; they looked through the resources available to them, and then they take it to the classroom level and work on perfecting materials, perfecting the lesson, that would support the area of academic concern.

These responses show these directors' beliefs in the importance of job-embedded, inquiry-based professional development for improving instruction and student learning. Instead of seeing lesson study as a RTTT initiative, they believed in the benefits of lesson study and expected all schools to practice lesson study as an example of such professional development.

However, in responding to our questions, these leaders expressed a hesitance about describing their lesson study practice as a “policy” or “requirement”. Mr. Wallace in Lester explained,

I don’t know I’ll use the word ‘required’ or ‘mandatory’—those words, we try not to use those words because they create a sense that it’s no longer voluntary, and we feel that it can impair involvement. So, we don’t use the word ‘require.’ It’s ‘expected’ that school would engage in the lesson study process.

He explained later that, as an expectation, there is no consequence for schools for not practicing lesson study. Ms. Anderson in Morison also explained that “it’s more institutionalized now. It’s less of a mandate, and it’s more of an outgrowth of professional learning communities.”

Ms. Clark further explained how schools started to see the benefit of lesson study after the initial expectation, which supported internalizing lesson study.

At the school level they found ways to embed lesson study in their work day, and in what they do, instead of a separate entity; and when it first started it wasn’t like that—they would do their professional development and then said, ‘Ok. Let’s start what we’re doing for lesson study.’ And it was very... it was an orchestrated endeavor. And slowly, as they got used to it, as job-embedded PDs became more popular, um, I think schools realize ‘Oh! This is actually a useful tool to practice the things that we’re learning.’

To support lesson study practice across the district, these leaders ensured that schools are given sufficient funding to meet the district expectation by drawing resources from various types of funding. Mr. Wallace in Lester explained, “We no longer have our lesson study project with Race to the Top...[so we use] Title II, and we have Focus Schools, meaning they are part of the DOE process, where the state identifies them, so there are additional funds there.” Ms. Anderson

in Morrison explained, “[We use] just strictly discretionary, you know—our substitute budget, we just use our substitute budget to pay for lesson study subs. Our standard allocation for substitute budget, which comes from general education funds, we used to fund lesson study.”

Promoting institutionalization of lesson study by respecting school ownership and leadership. With almost all schools practicing lesson study within the district, all three professional development directors explained how lesson study has spread since they started it in 2010. What was common in the districtwide implementation processes these leaders shared was the move from initial requirement and training to promotion of school ownership and leadership in organizing lesson study and embedding it as part of the schools’ organizational routines.

Interviewer: How often do you offer training for the schools?

Ms. Clark: It hasn’t been often, and I think it’s been 2 years since last time we had it. It’s pretty much being able to sustain themselves... you know, and they kinda embedded with their professional learning communities. So, the requirement that every school does at least one lesson study cycle—most schools do multiple cycles now. It just part of their professional learning.

Ms. Clark also explained how district-level coaches are less involved in lesson study to make the process “more authentic” and school- or teacher-driven. Likewise, she explained the changing role of the initial template that guided lesson study process by saying, “The templates aren’t that useful anymore. I think what happened now is that, schools have moved beyond the templates. And so, we’re really lenient about the templates at the district level; we leave it up to the schools.” Her explanations show the process in which lesson study evolved from something external that needed to be guided by training, coaches, and templates to something internal that is

embedded into the school organizational structures and routines through school leadership, promoting institutionalization of lesson study.

When asked about who coordinates lesson study, Mr. Wallace in Lester responded, “There would be, at the school level, you’ll have your grade level teams, your PLCs, and each school has a lead team, so it’s not necessarily one person assigned to oversee this initiative.”

Regarding the question about when lesson study groups meet, he said,

It could be during planning time... it could be during specific time that’s set aside for grade level teams with the Title II money where we can get subs, and they look at standards, and looking at lessons, and developing lessons. So, it depends on the schools.

To the same question, Ms. Anderson responded:

Yes, there’s no formal schedule for that. It’s whenever the lesson study group meet, and when substitutes are available, so it’s really covered by the way school functions, and what resources the school can pull together. Because the school principals are behind it. I mean, they work to help the lesson study groups schedule observations.

Their responses show how lesson study is now self-sustaining at school level, thus there is no need for the districts to provide specific direction or guidance to schools.

The professional development directors’ responses to the question about future sustainability plan showed the continuation is assumed now that lesson study is self-sustaining and becoming institutionalized.

Interviewer: So, is your district planning to support lesson study in the future as well?

Ms. Anderson: Well, we have it as a district’s best practice. So, I mean, there’s an expectation that lesson study would continue. But schools are charged with making that happen.

Ms. Anderson also explained the process of institutionalizing lesson study by sharing findings at faculty meetings as part of the professional growth plan:

We have lesson study groups who are presenting their findings, and the results of their lesson study to the entire faculty, because of any time somethings [that] come up are things that can help not just their particular grade level, or professional learning community, but they have broader applications across the school. So, we know that those groups are sharing at faculty meetings, because we participate—we go to schools, and we’ve seen this happening a lot.

The findings from the interviews with these directors support the findings from the statewide survey. In the districts where lesson study is implemented districtwide, job-embedded inquiry-based professional development like lesson study is an expectation for all the schools. After several years of lesson study effort, the districts seem to be embracing lesson study as a core part of their professional activities, and not as something required by the state. They provide sufficient funding to support schools to meet this expectation using various types of funding sources. Because the districts support and respect school ownership and leadership in organizing lesson study, factors such as designated positions for lesson study at the district level, and leadership stability may not matter much for schools’ practice of lesson study. Having a future sustainability plan is part of the natural response of the districts where lesson study is internalized and becoming institutionalized within and across schools.

Discussion and Conclusions

Lesson study was introduced to district leaders across the state by FLDOE in 2010 through the RTTT program. Five years later in 2015, district leaders across the state reported that

lesson study has spread to a total of 749 schools across 39 districts—a significantly larger number of schools than the number of schools (66 schools) required by FLDOE to practice lesson study (Authors, 2016). Based on a mixed methods study of a statewide survey of district professional development directors and interviews of three professional development directors in the districts where lesson study is implemented districtwide, we investigated the district policies and leadership practices associated with the level of lesson study implementation as a promising professional development initiative to promote instructional improvement across the district.

We found that neither district background characteristics (size, poverty level, diversity level, and achievement level) nor districts' RTTT participation were significantly associated with the reported level of lesson study implementation. In addition, a designated district position for lesson study and professional development director stability did not differentiate the districts with a high level of lesson study implementation from the others in both years.

Instead, district policy requiring all schools to practice lesson study, funding for substitutes and teacher payment, and districts' future sustainability plan were positively and significantly associated with the level of lesson study implementation reported by district leaders. The interviews with professional development directors of three districts where lesson study is practiced in over 90% of the schools revealed that they believed in the benefits of lesson study and all schools are expected to practice lesson study as an exemplary job-embedded inquiry-based professional development. These district leaders also secured funding from various sources to support schools to meet this expectation even after the RTTT funding ended. These district leaders internalized lesson study through the district policy and funding provision based on their belief in lesson study, instead of as a RTTT mandate. Over time, they have promoted school ownership and leadership, which promoted institutionalization of lesson study within

schools. As the school leaders schedule and organize lesson study, it became embedded within their unique organizational structures and routines. Thus, district-level factors such as a district position and leadership stability seem to have become less important over time.

McLaughlin and Mitra (2001) and Firestone et al. (2005) discussed the important role of district leaders in legitimizing the reform initiative and bringing consistency and coherence to schools and teachers. All three district leaders interviewed prioritized lesson study over other initiatives through a district-wide expectation and funding. In this sense, lesson study has spread in these districts by influencing district policies and procedures, and creating normative coherence across the system (Coburn, 2003). At the same time, the district leaders were aware that school ownership was critical for internalizing lesson study introduced through the RTTT program, and gradually withdrew district involvement through training, templates, and coaching and promoted schools' decision making in organizing and supporting lesson study. This finding is consistent with the previous scale-up research that showed the importance of ownership and capacity building (Coburn, 2003; Dede & Honan, 2005; McLaughlin & Mitra, 2001).

The interview data also indicate that, given the differences in school contexts— leadership, resources, teacher relationships, student characteristics, relying on the school leaders to exercise their decisions regarding lesson study is perhaps the only feasible way to sustain lesson study across the district. Dede and Honan (2005) pointed out the coping with changes in context, leadership and funding is a critical factor for scaling up improvement at a system level. This school-driven process of lesson study would likely endure changes in the district contexts including leadership turnover, changing priorities, and funding availability.

Promoting school ownership of lesson study, however, also implies that lesson study is likely to be adapted into the unique school contexts in order to be embedded in the organizational

structures and routines. Such adaptation of an innovation – especially in the case of lesson study as an international innovation that emerged in different cultural and organizational contexts – has been identified as a natural part of scaling up across diverse contexts (Dede & Honan, 2005; McLaughlin & Mitra, 2001). In the case of lesson study, it is important that such adaptation does not involve the alteration of the core principles that lead to improvement of instruction and student learning.

Although our research validated the district-level understanding and promotion of lesson study followed the core principles of teacher-driven, collaborative, and inquiry-based process, our data collection was limited to district leaders, and we did not gather data from school leaders to examine the nature of the actual lesson study practice implemented at school sites. Thus, it is important to point out the limitation that the measure of lesson study implementation reported by district leaders does not capture the actual quality of lesson study practice. While examining the school-level practice of lesson study in all 34 districts that reported at least one school practiced lesson study is beyond the scope of the current study that focused on district policy and leadership practice, the future studies should examine the nature and quality of lesson study practices in order to understand how these district policy and leadership practices would influence the quality of teacher learning through lesson study.

In addition to understanding the nature and quality of lesson study practice, it is also important to pay attention to the design features of lesson study such as the length and duration of lesson study to maximize collaborative teacher learning, access to expert knowledge through curriculum resources and knowledgeable others to build context-specific practitioner knowledge through research lessons (Chokshi & Fernandez, 2004; Fernandez, 2005; Fernandez & Cannon, 2005; Fernandez, Cannon, & Chokshi, 2003; Hart & Carriere, 2011; Lewis & Perry, 2014; Perry

& Lewis, 2009; 2010), and opportunities to develop a shared vision of ambitious instruction through observation of research lessons across schools (Author, 2016; Lewis, 2015). These are the unique characteristics of lesson study practiced in Japan (Author, 2016; Hiebert, et al., 2002; Lewis, 2015; Lewis et al., 2006), yet no previous lesson study research or the current study provided evidence of these design features to be fully implemented in lesson study practice in the U.S. so far. Future studies need to identify the barriers for implementing these design features in order to maximize the potential of lesson study in promoting instructional improvement.

The findings from this study have important implications for district policy and practice for implementing reform-based professional development. First, lesson study and any other reform-based professional development may not be implemented districtwide and be sustained if the districts keep the ownership and focus on the “fidelity” of the professional development model. Previous research showed that many districts in Florida used a pre-packaged lesson study kit filled with templates, steps, and procedures (Authors, 2016). Three districts that reported a districtwide implementation of lesson study developed their own initial process to introduce lesson study to schools as a way to internalize lesson study that was introduced by the state department of education, and gradually released the district involvement to promote school ownership and leadership in organizing lesson study and to embedding it into the schools’ organizational structures and routines.

Second, having a district-wide expectation on lesson study as a practice of job-embedded inquiry-based professional development and providing necessary funding while respecting school leadership in organizing and practicing lesson study may likely promote the process of internalizing and institutionalizing lesson study—which may naturally lead to sustainability in changing state and district contexts. Districts play an important role in legitimizing a certain

practice and sending a coherent message on what they value to schools and teachers. In lesson study, the district leaders effectively communicated the importance of school-driven, job-embedded, and inquiry-based professional development and respected and supported school decisions on how to organize lesson study.

Finally, district leaders need to trust the capacity of school leaders to organize lesson study and promote instructional improvement. In the current policy climate when districts are held accountable for the student learning outcomes, a natural response of many district leaders may be to scrutinize school leadership practice by controlling school management and funding, and to hold the school leaders or teachers accountable for the teacher evaluation results using value-added scores. The districts may also control professional development activities by sending instructional coaches and ensuring that teachers follow specific approaches to professional learning and instruction. Yet, as the current study indicates, such approaches will not likely draw commitment from school leaders or teachers nor build their capacity to engage in the process of improving instruction and student learning. Lesson study as a teacher-driven, collaborative, and inquiry-based professional learning process provides an opportunity for districts to support capacity building of school leaders and teachers by building a professional knowledge and a shared vision of ambitious instruction promoted by the CCSS. It is up to the district leaders whether they see this as another reform mandate or an opportunity to develop instructional capacity and shared vision to promote districtwide improvement of instruction and student learning.

Notes

¹ The 13 projects are as follows: Project 1: Expand Lesson Study; Project 2: Expand STEM (Science, Technology, Engineering, and Mathematics) Career and Technical Program Offerings; Project 3: Increase Advanced STEM Coursework; Project 4: Bolster Technology for Improved Instruction and Assessment; Project 5: Improve Access to State Data; Project 6: Use Data to Improve Instruction; Project 7: Provide Support for Educator Preparation Programs; Project 8: Improve Teacher and Principal Evaluation Systems; Project 9: Use Data Effectively for Human Capital Decisions; Project 10: Focus Effective Professional Development; Project 11: Drive Improvement in Persistently Lowest Achieving Schools; Project 12: Implement Proven Programs for School Improvement; and Project 13: Include Charter Schools in LEA Planning. These projects were developed to address four core education reform areas specified by the U.S. Department of Education (USDOE): (a) standards and assessments, (b) data systems to support instruction, (c) great teachers and leaders, and (d) turning around the lowest-achieving schools.

² Four university lab schools were excluded from the survey due to the different size and administrative structures of these schools from the other districts.

³ A smaller amount of incentive was given in 2015 due to the shorter length of survey compared to the 2014 survey.

⁴ While a total of 58 districts out of 68 districts participated in the survey in 2014 and 2015, 5 districts in each year participated did not participate in both years. Thus the data are presented on 53 districts in these figures.

⁵ School Improvement Grants (SIG) are grants to State Educational Agencies (SEAs) from the USDOE, authorized under section 1003(g) of the Elementary & Secondary Education Act (ESEA) of 1965 (USDOE, n.d.). The SEAs that receive the funds are then required to distribute at least 95% of the funds to the LEAs in their respective state for the purpose of supporting PLA schools. The USDOE recommends the use of the SIG funds for job-embedded professional development as part of turnaround model for school improvement among others (USDOE, n.d.), thus districts in Florida that received SIG can choose to use it for job-embedded professional development including lesson study.

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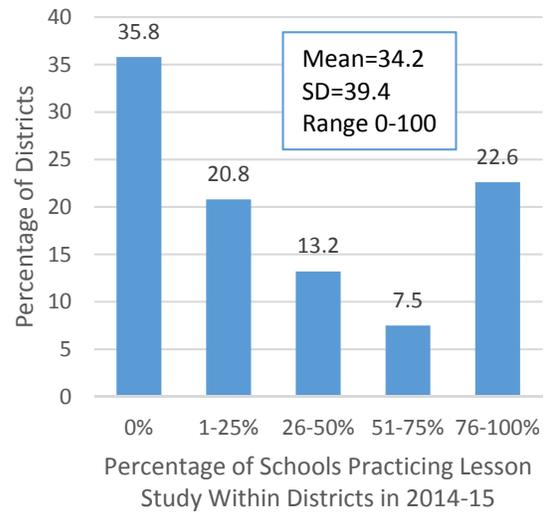
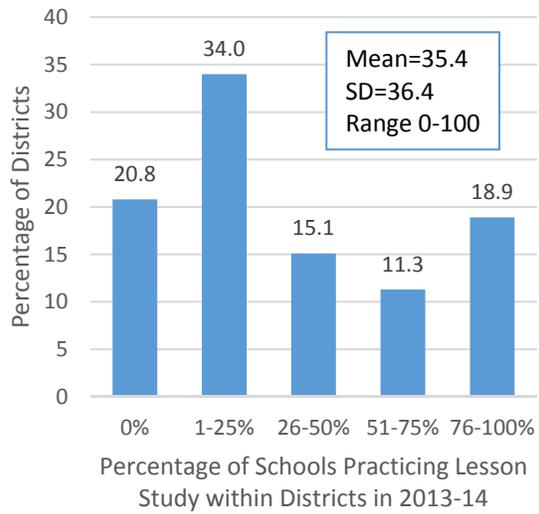


Figure 1: District Level of Lesson Study Implementation in 2014 and 2015

Table 1: District Policy and Leadership for Promoting Lesson Study

		2014					2015				
		N	Mean	Min	Max	SD	N	Mean	Min	Max	SD
District Background	Size (enrollment)	58	33,125	1,035	272,785	49,776	58	45,677	1,244	357,586	70,983
	Poverty	58	47.0	18.5	75.4	12.3	58	57.6	23.8	99.8	11.17
	Diversity	58	40.5	9.6	96.6	18.9	58	43.6	9.6	92.7	19.00
	Achievement	58	56.3	41.3	75.5	7.1	58	52.3	31.0	75.0	8.02
RTTT Participation	LS ¹ Proposal	52	0.54	0	1	0.50	52	0.56	0	1	0.50
	State Requirement (PLA Schools)	52	0.37	0	1	0.49	52	0.37	0	1	0.49
	LS Funding (\$)	52	79,872	0	1,807,159	278,301	52	76,611	0	1,807,159	278,555
	Total RTTT Funding (\$)	52	4,443,403	5,787	37,575,662	7,127,040	52	6,331,057	5,787	73,376,735	12,235,167
	District Policy	LS Requirement	58	1.59	1	3	0.77	58	1.41	1	3
District Funding Allocation	Substitutes	58	0.45	0	1	0.50	58	0.36	0	1	0.49
	Teacher Payment	58	0.14	0	1	0.35	58	0.22	0	1	0.42
District Leadership	Designated Position for LS	58	0.53	0	1	0.50	58	0.24	0	1	0.43
	PD Director Stability (13-14 & 14-15)	53	0.64	0	1	0.48	53	0.74	0	1	0.45
	Future Sustainability Plan	58	0.59	0	1	0.50	58	0.62	0	1	0.49

Notes: ¹LS=lesson study

Table 2: Relationships between District Factors and the District Level of Lesson Study Implementation

			2014		2015	
			Implemen tation Level ¹	F/t value ²	Implemen tation Level ¹	F/t value ²
District Policy	Lesson Study Requirement	No schools	21.5	F=16.70**	24.8	F=15.69**
		Some schools	36.8		38.5	
		All schools	82.4		91.5	
Funding Allocation	Substitutes	Yes	51.6	t=3.23**	45.0	t=1.21
		No	22.8		31.8	
	Teacher Payment	Yes	39.8	t=.34	65.2	t=3.16**
		No	35.1		28.3	
District Leadership	Designated Position for Lesson Study	Yes	44.3	t=1.98	47.3	t= 1.16
		No	25.8		33.2	
	PD Director Stability (13-14 & 14-15)	Yes	37.1	t=.63	33.2	t=-.31
		No	30.2		37.1	
	Future Sustainability Plan	Yes	47.0	t=3.00**	50.3	t=3.71**
		No	19.7		14.0	

* p<.05, ** p<.01

Note: ¹ Implementation level was measured by the percentage of schools within districts that practiced lesson study. ² F value is presented for ANOVA result on the mean difference among 3 or more groups, and t value is presented for t-test result on the mean difference between two groups.

Appendix A: Comparison of Background Characteristics between Surveyed Districts and Population

	2014		2015	
	Surveyed Districts (N=58)	Population (N=68)	Surveyed Districts (N=58)	Population (N=68)
Average District Enrollment	33,125	38,196	45,677	40,950
Poverty Level: % of Students with Free or Reduced Price Lunch (FRL)	57.3%	57.7%	57.6%	57.9%
Ethnic Diversity Level: % of Ethnic Minority Students	41.6%	42.6%	43.6%	43.9%
Achievement Level: % of Students meeting Proficient Level	56.3%	56.3%	52.3%	52.3%

Appendix B: Relationships between District Background Characteristics and Lesson Study Implementation Level

		2014	2015
		Pearson r	Pearson r
District Size	Enrollment	-.14	-.18
Poverty Level	Percentage of FRL students	.10	.09
Diversity Level	Percentage of Ethnic Minority Students	-.06	-.16
Achievement Level	Percentage of Students with Proficient or Above	-.17	.05

* p<.05, ** p<.01

Appendix C: Relationships between RTTT participation and Lesson Study Implementation Level

		2014		2015	
		Mean scale level	t/r value ¹	Mean scale level	t/r value ¹
LS ² Proposal	Yes	45.4	t=1.73	38.5	t=.38
	No	28.4		34.3	
State Requirement (PLA Schools)	Yes	44.8	t=1.10	41.1	t=.62
	No	33.4		34.0	
LS ² Funding		-	r=-.10	-	r=.08
Total RTTT Funding		-	r=-.11	-	r=-.14

* p<.05, ** p<.01

Note: ¹ t value is presented for t-test result on the mean difference between two groups, and r (Pearson r) value is presented for a correlation between the scale-level (percentage of schools practicing lesson study) and continuous variables.

²LS=lesson study