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Lesson Study in Florida

A Longitudinal Survey of District Policy and Practice from 2013 to 2015

Florida State University

Motoko Akiba
Associate Professor
Educational Leadership & Policy Studies

Bryan Wilkinson
Educational Leadership & Policy Studies

Guillermo Farfan
Educational Psychology and Learning Systems

Cassie Howard
Educational Leadership & Policy Studies

Angelina Kuleshova
Educational Psychology and Learning Systems

Jennifer Fryer
Educational Leadership and Policy Studies

University of Florida

Aki Murata
Associate Professor
School of Teaching and Learning

Brittany Eichler
School of Teaching and Learning



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Aki Murata

Associate Professor
School of Teaching and Learning

Brittany Eichler

School of Teaching and Learning

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Please contact Dr. Motoko Akiba at makiba@fsu.edu for questions regarding this report.

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INTRODUCTION

Lesson study is a teacher professional development model in which a group of teachers work collaboratively to study and plan a lesson, observe the lesson in a classroom with students, and analyze and discuss the student work and learning in response to the lesson (Fernandez & Yoshida, 2004; Lewis, 2002; Lewis & Hurd, 2011; Stepanek, Appel, Leong, Mangan, & Mitchell, 2007). Lesson study was introduced to the United States from Japan in the late 1990s after an international video study revealed that, in comparison to U.S. math lessons that focus on lower-level mathematics skills, Japanese math lessons focus on promoting students' conceptual understanding (Stigler & Hiebert, 1999). This study found lesson study to be the driving force that enabled Japanese teachers to practice student-centered, inquiry-based instruction.

Florida is the first state to promote lesson study as a statewide professional development model for implementing the state standards and improving instruction and student achievement, using part of the \$700 million Race to the Top (RTTT) grant. The Florida Department of Education (FLDOE) specified a state requirement for lesson study in 2010, stating that “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” (Florida Department of Education, 2010, p. 6). Despite the large number of districts and schools practicing lesson study in Florida and across the country, there have been few systematic studies of district policy and practice for promoting lesson study (Akiba, & Wilkinson, 2015; Hart, Alston, & Murata, 2011).

In order to fill this knowledge gap, the project team conducted a longitudinal online survey of Florida districts in 2013, 2014, and 2015 to examine the district policies and practices for promoting lesson study and the changes in these policies and practices over time. The results from the 2013 and 2014 were summarized in *Lesson Study Policy and Practice in Florida: 2014* (Akiba, Ramp, & Wilkinson, 2014) and *Lesson Study Policy and Practice in Florida: 2015* (Akiba, Howard, Wilkinson, & Whitacre, 2015). The project team conducted the third year of this longitudinal survey in summer 2015 to understand the district lesson study policies and practices during the 2014-2015 academic year. This report is based on the longitudinal results from 2013, 2014, and 2015. The results are presented with six sections: 1) District policy and practice, 2) Leadership, 3) Funding, 4) Lesson study schedule, 5) Professional development programs, and 6) Sustaining lesson study.

Understanding the characteristics of district policies and practices across the state and changes over the years will inform FLDOE in examining the influence of the state policy on lesson study and to provide necessary support to promote successful practice of lesson study. In addition, this report will inform the district administrators about the policies and practices of other districts across the state, which may be useful for further promoting the current policy and support structures or for introducing new approaches to improve school and teacher practice of lesson study.

EXECUTIVE SUMMARY

In summer 2013, 2014, and 2015, professional development coordinators of all 68 districts in Florida were invited to participate in a longitudinal online survey, *Lesson Study District Survey*. A total of 53 districts participated in the survey in 2013 (78% response rate), and 58 districts participated in 2014 and 2015 (85% response rate). District characteristics of the participating districts were similar to the state averages, showing that the results are likely to be generalizable to the entire state. The survey asked the districts to report on the policies and practices of lesson study that the district implemented for the academic year prior to the survey year. The results are organized by six topics, as listed below.

District Policy and Practice: The level of district requirement of lesson study has decreased over the years with smaller percentages of districts requiring all schools to practice lesson study (25% in 2013 to 16% in 2015) or PLA or low-achieving schools to practice lesson study (25% in 2013 to 7% in 2015). Accordingly, the total number of schools required to practice lesson study decreased from 611 in 2013 to 557 in 2014, and to 427 in 2015. However, the total number of schools that actually practiced lesson study including those schools that volunteered increased from 668 in 2014 to 749 in 2015.

Leadership: The number of formal district leadership positions designated for lesson study has also decreased over time. In 2013, 36% of the districts had a lesson study coordinator who oversees the facilitation of lesson study across the district. However, only 26% of the district had a lesson study coordinator in 2014, and the percentage decreased to only 19% in 2015.

Funding: The district funding for hiring substitute teachers to allow regular teachers to participate in lesson study also decreased over time. In 2013, 51% of the districts provided substitute funding, which decreased to 43% in 2014, then to 36% in 2015. The funding for teacher stipends to participate in lesson study, however, increased from 13% in 2013 to 22% in 2015.

Lesson Study Schedule: The most typical lesson study practiced across Florida school districts spans 2-4 days, and teachers spend a total of 6-8 hours on average. This is fairly short compared to the original model of lesson study that spans several months.

Professional Development Programs: The districts reported they offer the average of 5 separate professional development programs including lesson study to their teachers consistently from 2013 to 2015. This context likely poses a challenge for districts to devote sufficient time and resources for promoting lesson study.

Sustaining Lesson Study: In 2013, 64% of the districts reported that they had a plan to sustain lesson study after the RTTT program ends in 2014. In 2014, the percentage decreased to 59%. In 2015, only 38% of the districts reported that they plan to continue to support lesson study during the 2015-2016 academic year.

METHODOLOGY

In the summer of 2013, 2014, and 2015, a link to an online survey, *Lesson Study District Survey*, was sent to directors of professional development or curriculum and instruction in all 68 districts in Florida. The survey targeted regular districts, thus did not include the four districts that consist of university lab schools. Participants were asked to respond to the questions regarding the policy and practice for promoting lesson study during the academic year prior to the survey administration. The initial invitation emails were sent in May and follow-up emails were sent and phone calls were made multiple times until the survey closed in mid-August of each year.

Table 1 presents the number of districts that participated in the survey and the response rate for each of the three years. In 2013, a total of 53 districts participated in the survey with a response rate of 78%. In both 2014 and 2015, 58 districts participated with a response rate of 85%. The average response rate is 83%, showing high response rates across all three years.

Table 1. Number of Participating Districts and Response Rates

Year of Survey	Number of Districts Participated	Response Rate
2013	53	78%
2014	58	85%
2015	58	85%
Average		83%

Table 2 presents a comparison of the characteristics of 53 districts in 2013 and 58 districts in 2014 and 2015 that participated in the survey to those of the population—all 68 districts in Florida (2014 statistics). In 2013, the average district enrollment and average number of school buildings across 53 participating districts were similar to those of the population—39,429 vs. 38,196 students, and 54 vs. 51 buildings. However in 2014 and 2015, some differences in these indicators of district size were observed. In 2014, 58 districts that participated in the survey tended to be slightly smaller on average (33,125 vs. 38,196 students, 44 vs. 51 buildings) than the population. In contrast, in 2015, 58 districts that participated in the survey tended to be slightly larger on average (42,213 vs. 38,196 students, 56 vs. 51 buildings) than the population.

Despite these slight differences in district size, the average levels of poverty and ethnic diversity were similar to the population averages across the three years of survey. From 2013 to 2015, the percentage of students with free or reduced-price lunch (FRL) ranged from 47 to 48% compared to the average percentage of 48% across all 68 districts. Likewise, the percentage of ethnic minority students was 41% in all three years, similar to 42% across all 68 districts.

Table 2. Comparison of District Characteristics: Participating Districts and All Districts

	Participating Districts			Population-
	2013 (N=53)	2014 (N=58)	2015 (N=58)	All 68 Districts (2014 statistics)
Average District Enrollment	39,429	33,125	42,213	38,196
Average Number of School Buildings	54	44	56	51
Poverty Level: % of Students with Free or Reduced Price Lunch (FRL)	48.0%	47.0%	48.0%	48%
Ethnic Diversity Level: % of Ethnic Minority Students	41.0%	41.0%	41.0%	42%

Based on these overall similarities of the characteristics of the districts that participated in the survey with those of the population, we can conclude that the findings from the survey data in this report are likely to be generalizable to the population of all 68 districts in Florida.

DISTRICT POLICY AND PRACTICE

To examine the districts’ policies and practices for promoting lesson study and how these policies and practices changed from 2013 to 2015, especially after the RTTT Program ended in 2014, the survey asked three questions about lesson study requirements and practice: 1) types of schools required to practice lesson study, 2) number of schools required to practice lesson study, and 3) number of schools that practiced lesson study.

The first survey question asked district representatives, “Which of the following statements best describes your district’s requirement on lesson study during the 2012-2013 [or 2013-2014, 2014-2015] academic year?” with four answer choices—1) all schools are required, 2) only Persistently Low-Achieving (PLA) or low-achieving schools are required, 3) other types of schools are required (with open-ended response to specify the types of schools), and 4) no school was required.

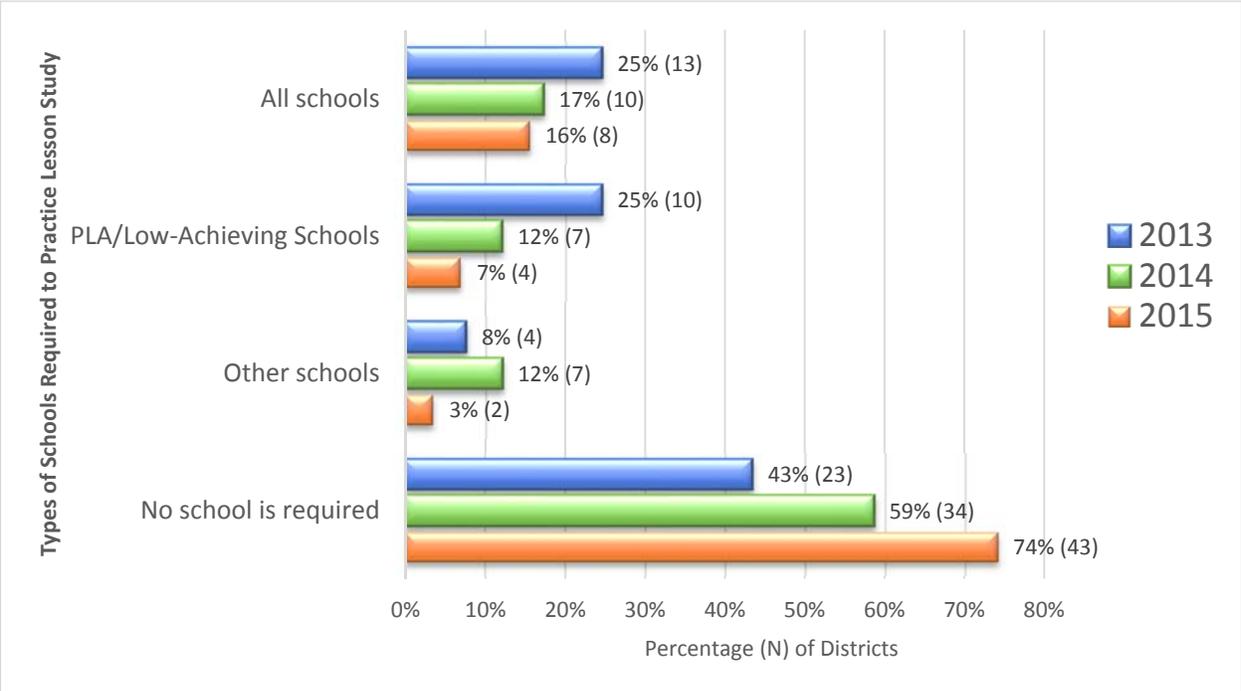


Figure 1: Types of Schools Required to Practice Lesson Study

Note: Percentages are calculated based on the total number of districts that participated in the survey in each year—53 in 2013 and 58 in 2014 and 2015.

Figure 1 shows responses to this item for the three years of the survey. Comparing the four types of responses, we can see that the most common response among these districts is “No school is required to practice lesson study.” In 2013, 23 districts (43%) did not require any school to practice lesson study, but the number increased to 34 districts (59%) in 2014, and 43 districts (74%) in 2015. Accordingly, the number of districts that required schools to practice lesson study decreased over the years. While a majority of the districts (57%) required lesson study in

2013, only less than half required lesson study (41% and 26% respectively) in 2014 and 2015. The number of districts that required all the schools to practice lesson study decreased from 13 (25%) in 2013 to ten (17%) in 2014 and eight (16%) in 2015. Such a trend was also apparent in the number of districts that required PLA or low-achieving schools—the requirement consistent with the FLDOE’s policy. In 2013, ten districts (25%) had this requirement, but in 2014 and 2015, the number decreased to seven (12%) and four (7%) respectively. A small number of districts reported that they required other types of schools such as elementary schools only or pilot schools. Four districts (8%) required other types of schools to practice lesson study in 2013 and seven districts (12%) did so in 2014. Only two districts (3%) required other types of schools to practice lesson study in 2015.

The second and third survey questions asked district representatives how many schools were required to practice lesson study and how many schools actually practiced lesson study, including those which practiced voluntarily. The results for these two questions are displayed in Figure 2.

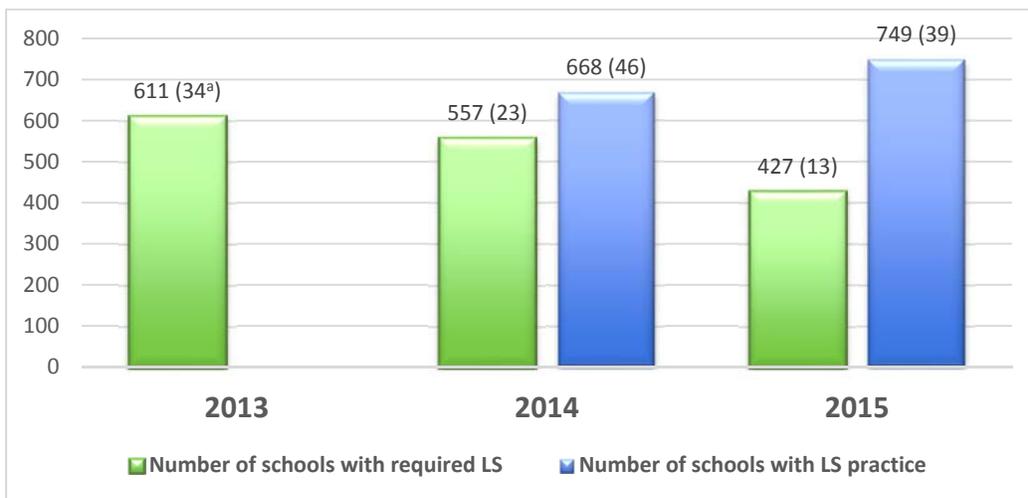


Figure 2: Number of Schools Required and Number of Schools Practicing Lesson Study

Note: ^a The numbers in the parentheses are the total numbers of districts where these schools belong to.

The light green bars show the total number of schools across all the participating districts that were required to practice lesson study. The total number of districts where these schools belong to is presented in the parenthesis. Consistent with the decreasing level of district requirement reported in Figure 1, the total number of schools required to practice lesson study decreased from 611 across 34 districts in 2013 to 557 across 23 districts in 2014, and to 427 across 13 districts in 2015.

The blue bars show the total number of schools that actually practiced lesson study during the preceding year reported by the districts. This question was not included in the 2013 survey. In 2014—the final year of the RTTT program, 668 schools practiced lesson study across 46 districts. In 2015, the number increased to 749 schools across 39 districts. This finding is surprising considering the absence of the RTTT funds and the decreased level of district requirements. In 2015, we can infer that 322 schools (749–427, assuming all required schools

practiced lesson study) voluntarily practiced lesson study. This suggests that some schools or teachers may have found lesson study beneficial enough to continue its practice without an official mandate to do so and managed to secure necessary funding (e.g., substitutes, teacher payment) for supporting teachers to practice lesson study.

In summary, the survey data showed that the level of lesson study requirements and the number of schools required to practice lesson study decreased over time. The year 2014 was the final year of the RTTT program and with expiration of the RTTT funding and the FLDOE's lesson study policy, the decreasing level of lesson study requirements is a natural response of these districts. Unexpectedly, however, the number of schools that actually practiced lesson study increased from 2014 to 2015. There is a possibility that the definition of what counts as lesson study varies across the districts, which may have resulted in an inflated number reported in the survey. The following sections will report on the other aspects of district approaches to promoting lesson study to further investigate the changes over the years.

LEADERSHIP

In order to understand district leadership in promoting and facilitating the process of lesson study, the survey asked district representatives whether there was a designated facilitator or coordinator at the district level whose main responsibility was to facilitate lesson study during the 2012-2013 [or 2013-2014, 2014-2015] academic year.

Figure 3 shows the percentage and number of districts that had a designated lesson study coordinator at the district level in 2013, 2014, and 2015. Across the three years, no more than 40% of all the participating districts reported the existence of a designated lesson study coordinator, and percentage decreased steadily from 36% (19 districts) in 2013 to 26% (15 districts) and to only 19% (11 districts).

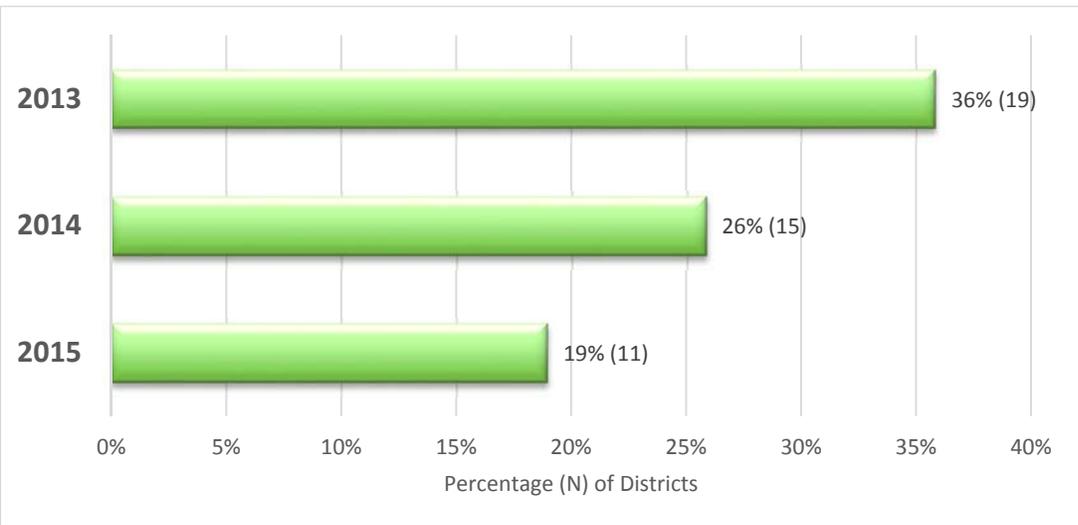


Figure 3: District-level Lesson Study Coordinators

This decreasing level of district-level leadership measured by a formal lesson study coordinator position is consistent with the decreasing level of lesson study requirement. Considering that the number of schools that practiced lesson study increased from 2014 to 2015, it is important for future studies to examine whether and to what extent schools are receiving sufficient district-level leadership support for practicing lesson study through other means such as support from instructional coaches.

FUNDING

District-level funding allocation is a critical aspect of efforts to promote teachers’ professional development (Akiba & Wilkinson, 2015). The continuous process of lesson study requires teachers’ time commitment, and funding is necessary to release teachers from teaching to participate in research lesson—in which one team member teaches a lesson while the other teachers observe and collect data on student learning—and to compensate teachers for their time outside regular school hours (e.g. after school meetings). Thus, the survey asked the district representatives whether the districts provided two types of funding important for practicing lesson study: 1) funding for substitutes and 2) stipends for teachers participating in lesson study.

Figure 4 reports the percentages and numbers of districts that provide funding for substitutes and stipends for teachers. Across the three years, the districts are more likely to provide funding for substitutes than paying teacher stipends for lesson study meetings. The figure shows that the decreasing level of districts’ provision of funding for substitutes for lesson study from 2013 to 2015. In 2013, about a half of the districts (51%) provided funding for substitutes, but the number decreased to 25 districts (43%) in 2014 and to 21 districts (36%) in 2015. This change is likely the result of the expiration of the RTTT funding in 2014. Interestingly, there has been an increase in the number of districts providing stipends to participating teachers, from seven districts (13%) in 2013 and 8 districts (14%) in 2014, to 13 districts (22%) in 2015. Some of the districts that used to provide funding for substitute teachers may have decided to provide stipends for teachers instead. Future studies may investigate the reasons for the increasing level of district investment in compensating teachers’ time for practicing lesson study.

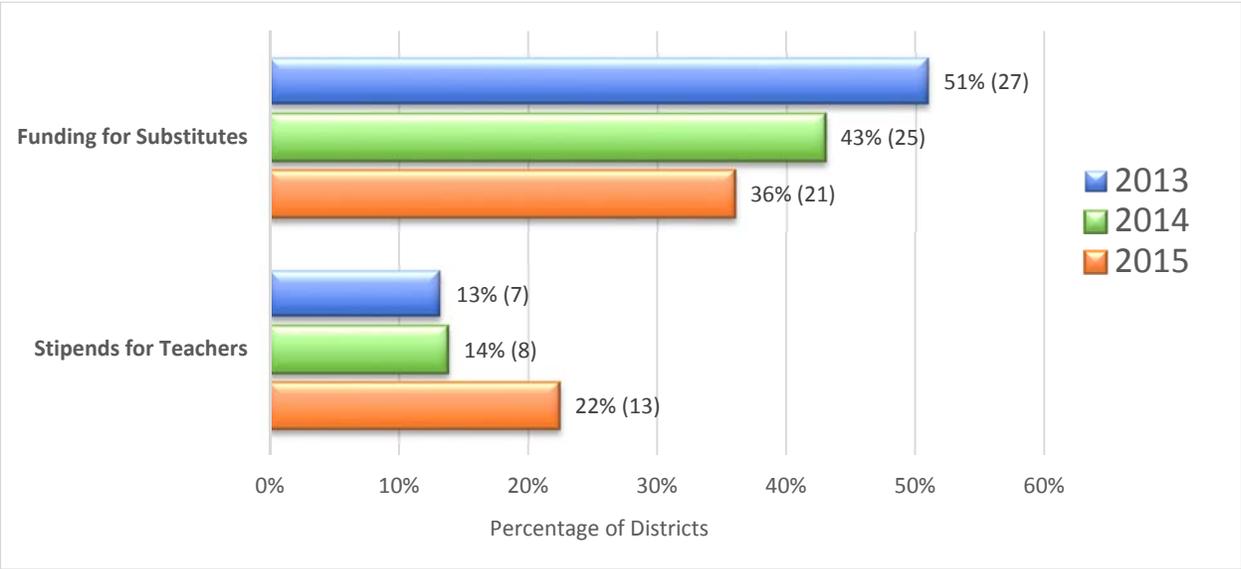


Figure 4: District Funding for Lesson Study

LESSON STUDY SCHEDULE

Previous studies have documented that the original model of lesson study in Japan has been modified to fit the organizational contexts surrounding the schools and districts in the U.S. (Akiba, in press; Akiba & Wilkinson, 2015). One critical modification is scheduling of lesson study meetings, due to the limited time available to the teachers in the U.S. (Murata, 2011; Yoshida, 2012).

The districts were first asked the number of schools that practiced lesson study. The 39 districts that reported at least one school were further asked two questions related to lesson study scheduling: 1) the average total number of hours spent for lesson study meetings in one cycle, and 2) the average time span of a lesson study cycle.

Figure 5 shows that almost half of all districts (19 districts, 49%) reported that lesson study groups spent 6 to 8 hours total for a lesson study cycle and about one third (13 districts, 33%) reported that lesson study groups spent 9 to 18 hours. Only 5 districts (13%) reported that they spent between 19 to 24 hours on lesson study, while 2 districts (5%) reported that the number of hours for a lesson study cycle is not specified at the district level.

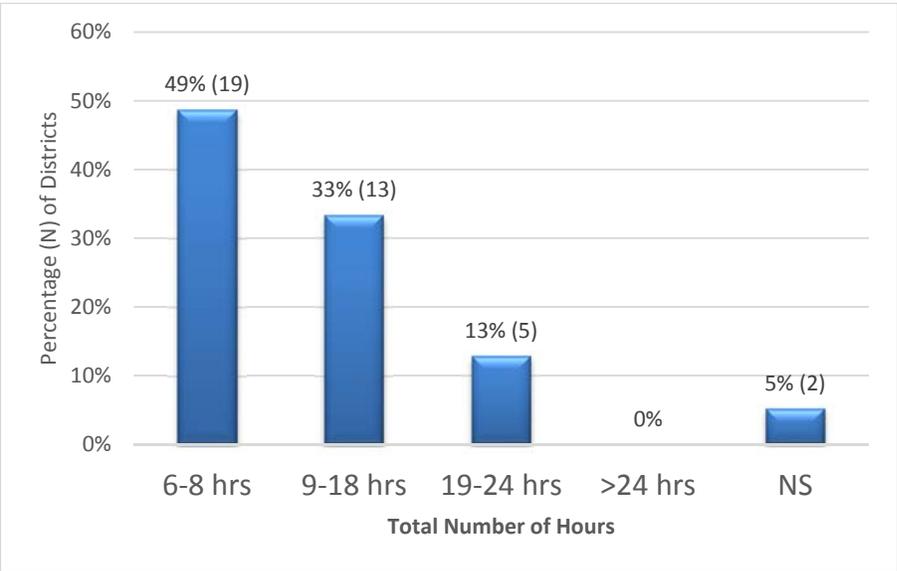


Figure 5: Average Total Number of Hours Spent on One Lesson Study Cycle

These 39 districts were further asked to report the average time span of a lesson study cycle by counting the number of days from the first meeting to the last research lesson and debriefing session. Figure 6 shows that 15 districts (38%) reported they completed one lesson study cycle in 2 to 4 days, while 10 districts (26%) said they completed it in 2 to 3 weeks. These lengths seem to be the typical time span of a lesson study cycle practiced by a majority of the districts. A significantly smaller number of districts reported that the time span is only one day (2 districts, 5%), one to two months (6 districts, 15%), and 3 months or more (2 districts, 5%). Four districts reported that the time span of a lesson study cycle is not specified at the district level.

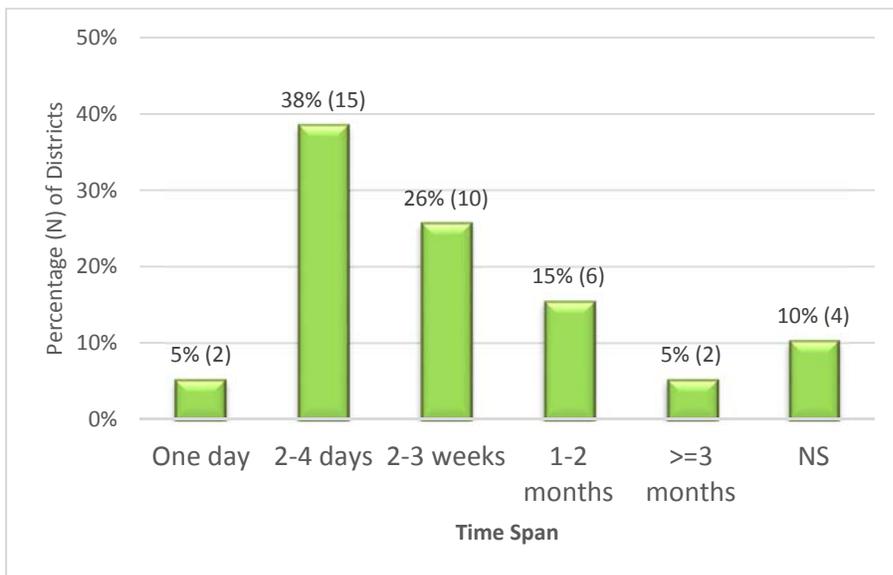


Figure 6: Time Span of One Lesson Study Cycle

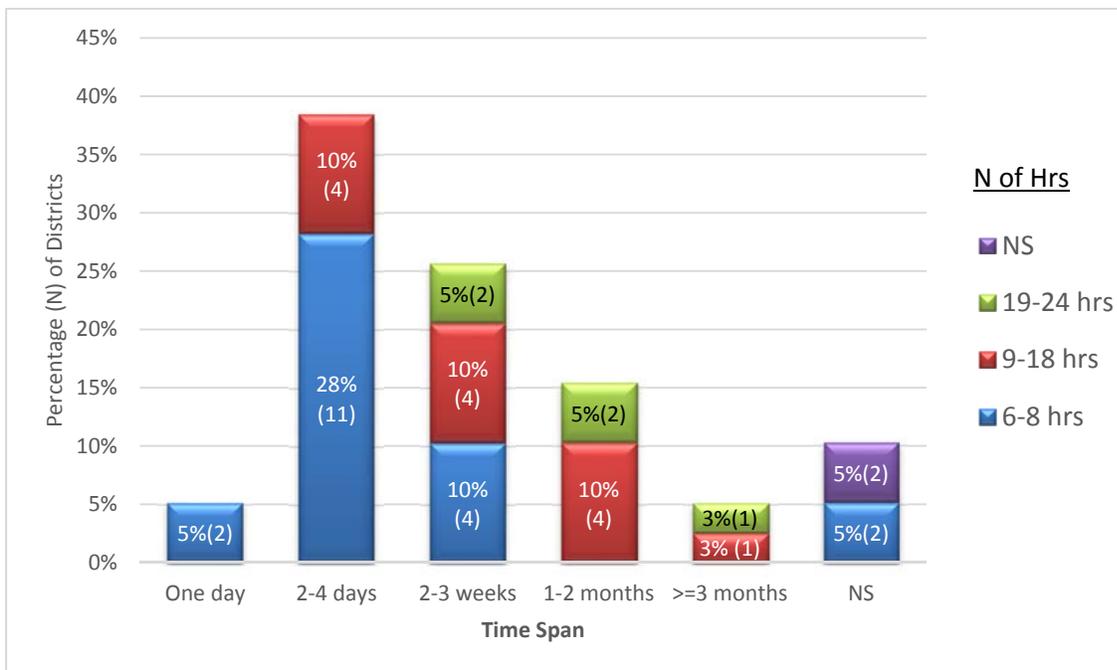


Figure 7: Average Number of Hours and Average Time Span of One Lesson Study Cycle

In order to examine the relationship between the average number of hours spent and the time span of a lesson study cycle, we reported the number of hours spent for lesson study for each of the six categories of the time span as shown in Figure 7. As expected, we see a correlation between the time span and the number of hours spent for one lesson study cycle. The districts with a shorter time span (less than 4 days) tended to spend a smaller number of hours (6-8

hours), and the districts with a longer time span (2 weeks or more) are more likely to spend longer hours (at least 9 hours) for a lesson study cycle.

These figures show that in Florida, lesson study has been typically practiced as a 2-4 day process or 2-3 week process, in contrast to Japan where lesson study groups typically spend 2 to 3 months per cycle (Akiba, in press). The survey did not ask how many cycles of lesson study teachers complete per year as most districts do not keep track of the frequencies, thus we do not know the total number of hours teachers spent for lesson study per year. However, the short-term process of lesson study is likely a result of multiple factors including a lack of teacher time, limited funding for substitutes and teacher payment, and unfamiliarity with a long-term teacher-driven process of lesson study.

PROFESSIONAL DEVELOPMENT PROGRAMS

One challenge for practicing a long-term process of lesson study may come from the fact that there are many other professional development programs promoted and facilitated by districts. To understand this district context that impacts the availability of district and teachers’ time for lesson study, we asked the professional development coordinators to list the professional development programs implemented during the preceding year of the survey. We counted the number of separate professional development programs including lesson study reported by the coordinators in 2013, 2014, and 2015.

Table 3: Descriptive Statistics of the Number of Professional Development Programs

	N of Districts	Mean	Min	Max	SD
2013	53	5.3	0	20	4.1
2014	58	5.5	1	23	3.7
2015	58	4.7	0	13	3.2

Table 3 presents the average number of separate professional development programs offered by the districts along with the range and standard deviation for each year. In 2013, an average of 5.3 programs were offered including lesson study with the range of 0 to 20. In 2014, the average slightly increased to 5.5 programs with the range of 1 to 23. In 2015, the average was slightly lower—4.7 programs with a smaller range of 0 to 13. These figures show that it is typical for these districts to offer about 5 separate professional development programs each year although there is a major variation across the districts. This means that lesson study is one of many programs districts are coordinating and it is likely that securing sufficient time to exercise leadership in promoting and supporting lesson study is a challenge for the professional development offices in many districts.

SUSTAINING LESSON STUDY

Sustaining the programs initiated through the RTTT program after the funding ended was one of the important goals of FLDOE (FLDOE, 2010). In 2010, each district that requested RTTT funding for lesson study was required to explain in the proposal how to sustain lesson study after 2014. Accordingly, our survey in 2013 and 2014 asked the district professional development coordinators, “Does your district have a plan to sustain lesson study after the 2013-2014 academic year?” In the 2015 survey, they were asked, “Does your district have a plan to continue to support lesson study during the 2015-2016 academic year?” The percentages and numbers of districts that answered “yes” to these questions are presented in Figure 8.

In 2013, 68% of the districts (36 districts) had a plan to sustain lesson study after the 2013-2014 academic year. The percentage decreased to 59% (34 districts) in 2014, but still the majority of the districts reported their plan to sustain lesson study. In 2015, one year after the RTTT program ended, only 38% of districts (22 districts) reported that they would continue to support lesson study during the 2015-2016 academic year.

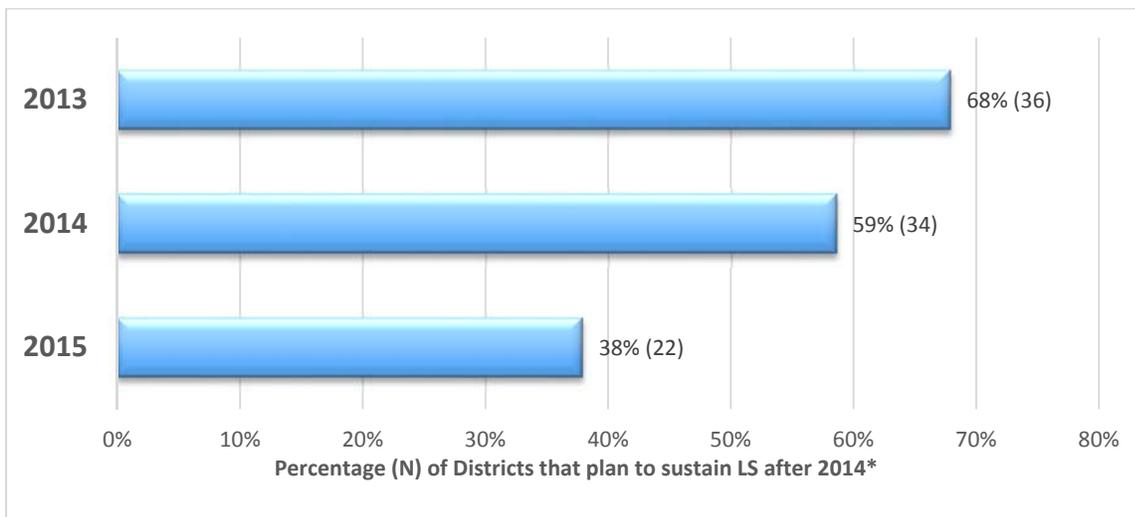


Figure 8: District Intention to Sustain Lesson Study

Note: ^a The bar in 2015 shows the percentage and number of districts that reported their intention to continue support of lesson study during the 2015-2016 academic year.

This trend of decreasing commitment to sustain lesson study is consistent with the decreasing levels of lesson study requirement, leadership positions, and funding support from 2013 to 2015. However, this district level trend is contrasting with the increasing number of schools that practiced lesson study from 2014 to 2015. Future studies are needed to investigate why and how these schools practiced lesson study in the district context with decreasing levels of district mandates and funding supports.

DISCUSSION AND CONCLUSIONS

Based on a longitudinal online survey of school districts conducted in 2013, 2014, and 2015, we examined the levels and changes in six aspects of lesson study: 1) District policy and practice, 2) Leadership, 3) Funding, 4) Lesson study schedule, 5) Professional development programs, and 6) Sustaining lesson study.

The survey data showed that the levels of district requirement, designated leadership position, and funding have decreased from 2013 to 2015. Accordingly, the number of districts that plan to sustain lesson study in the future decreased over the years. The federal Race to the Top (RTTT) program encouraged state departments of education to develop innovative reform plans, and lesson study was one of 13 programs and initiatives proposed by the Florida Department of Education (FLDOE). FLDOE successfully won the RTTT funding in late 2010, and the districts submitted a proposal that included their plan to support lesson study during the four year period of the 2010-11 academic year through the 2013-14 academic year. Our earlier study showed that the districts did not request sufficient funding to support lesson study due to the limited understanding of the time-intensive nature of lesson study, and as a result, many districts struggled to financially support lesson study groups (Akiba & Wilkinson, 2015).

Given this background, the decreasing levels of requirement, designated leadership position, and funding is likely a natural response of these districts. When we asked the districts to report the actual number of schools that practiced lesson study, however, we found that more schools were reported to have practiced lesson study in 2015 (749 schools) than in 2014 (668 schools). A total of 749 schools constitutes 23% of 3,253 schools in the 58 districts that participated in the survey in 2015. This is a significant level of practice considering the many other professional development programs that are made available to teachers.

The question may arise as to how these schools practiced lesson study in the context of decreasing district level leadership and funding. Our survey data on lesson study schedule in 2015 may provide part of the answer to this question. The professional development coordinators were asked about the typical time span and total number of hours spent for one cycle of lesson study in their districts. The data showed that about half of the districts spend only 6-8 hours for one cycle of lesson study in a time span of no more than 4 days. This short cycle of lesson study does not require a significant level of funding from the district, and schools can probably support lesson study using their own discretionary funding for professional development.

This modified version of lesson study may be the only feasible option for many schools. Our survey also showed that the districts are offering an average of five professional development programs each year. The list of professional development programs likely changes each year based on the district priorities and various requirements and initiatives from the state level. In this context, it is natural that district leadership and funding that can be devoted to a single type of professional development such as lesson study are limited. At the same time, it was probably possible for an increasing number of schools to practice lesson study because of this modified, short-term model of lesson study.

In considering sustainability and scalability of reform-oriented professional development such as lesson study, it is critical to consider both the quantity and quality (Coburn, 2003). The survey data showed the encouraging figure in terms of the quantity—increasing number of schools are practicing lesson study. However more studies are needed to look into the quality of these lesson study practices through case studies, and the impact these practices have on lesson study group members' instructional work and on students' learning.

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BIOGRAPHIES OF RESEARCHERS

Dr. Motoko Akiba is an Associate Professor of Education Policy in the Department of Educational Leadership and Policy Studies at Florida State University. Dr. Akiba's research expertise is in teacher professional development, teacher policy and reform, and comparative education policy. Dr. Akiba received her dual-title Ph.D. in Educational Theory and Policy, and Comparative and International Education from Pennsylvania State University-University Park. She completed a post-doctoral training on lesson study with Dr. Catherine Lewis at Mills College. After serving as a senior researcher at Mid-continent Research on Education and Learning (McREL) and a faculty member at the University of Missouri, Dr. Akiba joined Florida State University in 2012. She published two books, "*Improving teacher quality: The U.S. teaching force in global context*" (Teachers College Press, 2009) and "*Teacher reforms around the world*" (Emerald Books, 2013) and published numerous journal articles on the topics including teacher professional development, teacher evaluation, and compensation and performance-related pay. As part of her comparative research, she observed and studied lesson study practices in Japan during the past decade. Since moving to Florida, Dr. Akiba has been working with district and teacher leaders in Florida to engage in lesson study process and studying lesson study effectiveness and scalability from policy perspectives with funding support from the National Science Foundation.

Dr. Aki Murata is an Associate Professor of Mathematics Education in the School of Teaching and Learning at University of Florida. Dr. Murata's research focuses on mathematics teaching and learning in elementary school classrooms, and teacher learning in professional development and teacher education contexts through lesson study. After obtaining her Ph.D. in Learning Sciences from Northwestern University, Dr. Murata received a prestigious AERA-IES postdoctoral fellowship to engage in a lesson study research project under the mentorship of Dr. Catherine Lewis at Mills College. She has published more than 30 articles in prominent journals internationally, and gives plenary invited talks at various international locations frequently. After serving at Stanford University and University of California - Berkeley as a faculty member, Dr. Murata joined University of Florida recently, to continue her research program with lesson study.

Bryan Wilkinson is a doctoral student in educational leadership and administration in the Department of Educational Leadership and Policy Studies at Florida State University. His research interests include professional development, science education, and district and school leadership. He is a full-time high school science teacher with 18 years of teaching experience. He earned a Master of Education Degree in Secondary Education from the University of North Florida.

Guillermo Farfan is a doctoral student in learning and cognition in the Department of Educational Psychology and Learning Systems at Florida State University. His research interests include the acquisition, organization, and dissemination of mathematical and scientific knowledge in education, and the relationships between epistemic beliefs, embodied cognition, and mathematical instruction. He earned a Master of Science Degree in Psychology from Walden University.

Cassie Howard is a doctoral student in educational policy and evaluation in the Department of Educational Leadership and Policy Studies at Florida State University. Her research interests include multicultural education and teacher-led professional development. She earned a Master of Arts Degree in Latin American Studies from the University of Florida.

Angelina Kuleshova is a doctoral student in learning and cognition in the Department of Educational Psychology and Learning Systems at Florida State University. Her research interests include mathematics teacher education and professional development with a focus on teacher reflection and pedagogical reasoning. She earned a Master of Science Degree in Mathematics Education from Florida State University.

Jennifer Fryer is a master's student in education policy and evaluation in the Department of Educational Leadership and Policy Studies at Florida State University. Her research interests include educational equity, and student and teacher assessment. She earned a Bachelor of Arts in English from Florida State University.

Brittany Eichler is a doctoral student in mathematics education in the School of Teaching and Learning at University of Florida. Her interests include the cause and dissemination of mathematical misconceptions across the grade levels and the relationship between algebraic thinking and algebraic representations. She earned a Master of Science in Teaching from University of Florida.

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