From Lesson Study to Lesson Link™: Classroom-Based Professional Development

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This paper was prepared for the April 2007 Annual Meeting of the American Educational Research Association, Chicago, IL, April 9-13, 2007.
This work was supported in part by a grant from the RGK Foundation.

Abstract

Challenges in adapting Japanese Lesson Study for an American context have included teachers' limited prior experience with action research and facilitation as well as a mismatch between American curricula and the time requirements of the traditional Japanese Lesson Study model. Lesson Link*™* adapts Japanese Lesson Study for American contexts and culture by creating small teacher teams, all of whom teach the lesson, adjusting the curricular pace for teaching the lesson multiple times, and implementing structures to build teachers' capacity for research and facilitation. This paper reports on a two-year mixed methods action research study of Lesson Link's implementation in one suburban school district, where over 120 teachers from 14 schools participated in 38 Lesson Link teams between 2005 and 2007. These teachers taught pre-kindergarten through tenth grade, and the content focus for Lesson Link teams included reading comprehension, mathematics, writing, health, science, and more. Most teams were led by full-time teachers who received training to become Lesson Link facilitators. Key findings demonstrate that participation in Lesson Link transformed group interaction among teacher teams, led to improved individual teacher instruction, and increased student achievement.

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Introduction

In spite of an intense, national focus on improving student achievement in the United States, an astonishing proportion of students are still being "left-behind." In 2005, for example, only 35% of fourth-grade students and 29% of eighth-grade students scored at or above the *proficient* level on the mathematics portion of the NAEP assessment (Perie, Grigg, & Dion, 2005). In addition, only 30% of fourth-grade students and 29% of eighth-grade students scored at or above the *proficient* level on the reading portion of the 2005 NAEP assessment (Perie, Grigg, & Donahue, 2005). While the intractable nature of the student achievement problem is often attributed to a lack of adequate funding for education, the good news is that "the single greatest determinant of learning is not socioeconomic factors or funding levels. It is instruction" (Schmoker, 2006, p. 7). By raising the level of classroom instruction, we can directly impact student achievement.

In *What Matters Most: The 1996 Report of The National Commission on Teaching and America's Future*, the Commission stated, "What teachers know and do is the most important influence on what students learn." (National Commission on Teaching and America's Future, 1996, p. 6). One way to impact student learning, therefore, is through effective professional development that leads to improved instructional practice (Cohen & Hill, 2000; Wenglinsky, 2002). Yet, getting at the instructional core of what teachers actually do inside their classrooms on a daily basis, has been particularly vexing for school reformers (Cuban, 1990; Tyack & Cuban, 1995).

Traditional professional development models designed to improve instruction, such as off-site trainings, rarely result in a change in teacher practice (Elmore, 2002; Joyce & Showers, 1995; Little, 1993). Teachers report that one-shot workshops and off-site trainings are of little value (Smylie, 1989). Much of the professional development currently provided to teachers fails to incorporate research-based best practices for adult learning (Elmore, 2002). In contrast, professional development

models that are aligned with research on best practices for teacher learning can change teachers' instructional practices in the classroom (Cohen & Hill, 2000; Darling-Hammond, 1998; Schmoker, 2006; Wenglinsky, 2002).

Effective Professional Development

Professional development that is closely connected to the classroom, content-focused and collaborative can lead to improvements in teacher practice (Elmore, 2002; Little, Gearhart, Curry, & Kafka, 2003; Schmoker, 2006) and student achievement (Wenglinsky, 2002).

Successful teacher learning is most likely to occur when new knowledge is presented within close "proximity to [classroom] practice" (Elmore, 2002, p. 8). Workshop sessions that are held off-site hold little practicality for teachers (Goldenberg & Gallimore, 1991); educators need to observe new strategies in action in order for them to be applicable to classroom use (Elmore, 2002). The more distant new learning is from the classroom environment, the less impact new knowledge will have on change in instruction (Joyce & Showers, 1995). When professional development is disconnected from authentic problem solving, it is unlikely to have an effect on teacher or student learning (Hawley & Valli, 1999; Stigler & Hiebert, 1999).

Effective professional development not only occurs close to practice, but also is anchored in authentic dilemmas teachers experience in their classrooms and content areas (Schmoker, 2006). Teachers may engage in activities that encourage them to define a problem within their teaching context, evaluate their students' needs and their own teaching in light of the problem, brainstorm and test solutions, and reflect on core learning (Hiebert, Gallimore, & Stigler, 2002). This type of content-focused professional development encourages teachers to deepen their own understanding of their subject area and how their students learn the new content (Sykes, 1999). Teachers who receive rich professional development in content areas are more likely to engage in effective classroom practices that increase student achievement (Wenglinsky, 2002). In a study of California mathematics teachers,

Cohen and Hill (2000) found that when teacher learning is aligned with curriculum and student learning needs, this new knowledge contributes to increased student achievement.

In addition, when teachers engage in collaborative professional development, they change their instructional practices (Darling-Hammond, 1997; Elmore, 2002; Garet, Porter, Desimone, Birman, & Yoon, 2001; Schmoker, 1996). In a case study of three elementary schools that have "beaten the odds" by improving achievement despite socio-economic barriers, Strahan (2003) found that a key factor of instructional improvement was teacher collaboration around issues of student learning. Langer's (2000) study of forty-four middle and high school teachers in twenty-five schools across four states found that a core feature of high-poverty schools with continuous improvement was teachers' involvement in professional learning communities where they had multiple opportunities to collaborate with colleagues (Langer, 2000). In this study, students whose teachers participated in collaborative learning models outperformed their peers in demographically similar areas (Langer, 2000).

Lesson Study

Japanese Lesson Study is a professional development model that seamlessly fuses together job-embedded practice, a focus on specific curricular content, and ongoing collaboration. Widely embraced by educators across Japan, lesson study is the process of actively planning, observing, revising, and sharing group-developed lessons. The premise behind lesson study is that the most effective way to improve teacher practice is in the "context of a classroom lesson" (Stigler & Hiebert, 1999, p. 11). To this end, teams of teachers meet regularly over the course of several years to co-plan, teach and revise a series of lessons. The teachers approach this task as teacher-researchers, crafting learning outcomes based on classroom observations, developing goals and questions to guide their research, and analyzing data collected from students. Lesson study generates knowledge that is immediately usable for classroom teachers (Stigler & Hiebert, 1999). By challenging teachers to problem-solve as researchers, the process helps bridge the gap that can exist between research theory

and its application to classroom practice. Lesson study involves a relentless focus on teaching and learning (Stigler & Hiebert, 1999). This intensive spotlight on instruction can bring content standards to life (Lewis, 2002) and deepen teachers' understanding of the content they teach (Perry & Lewis, 2003).

While hailed as a way to improve practice and alter the culture of teacher isolation, lesson study has achieved mixed results in American classrooms (Campbell, 2003; Ermeling, 2005; Fernandez, 2002; Perry & Lewis, 2003). American educators piloting the Japanese lesson study model grapple with issues of curriculum disconnect, time limitations, and facilitation challenges. Unlike Japanese curriculum that focuses on a few topics in greater depth, American curriculum scurries quickly through a wide range of content standards. Spending several months or years developing a small sampling of lessons is incompatible with the nature of the broad scope and sequence of instruction in the U.S. (Campbell, 2003; Fernandez & Chokshi, 2002). Furthermore, when teachers feel pressured by the demands of daily school life they are less likely to spend a great deal of time engaging in dialogue that does not immediately impact their instruction (Campbell, 2003).

An additional hindrance to implementing lesson study in U.S. classrooms is the limited practice among American educators to engage in research-driven professional development (Fernandez, 2002; Stigler & Hiebert, 1999). Very few teachers have had authentic experiences that challenged them to be researchers; as a result their skills in this area are underdeveloped (Fernandez, 2002; Stigler & Hiebert, 1999). A three-year examination of a lesson study model in New Jersey and New York revealed that participating teachers struggled with the bare essentials of research design: posing guiding questions, designing the classroom experiment, determining the kind of data to be collected, and interpreting and generalizing results (Fernandez, 2002). Even the most successful lesson study models required having a skilled outside facilitator to guide inexperienced teachers through the process (Ermeling, 2005).

Rationale for the Study

While our work as professional developers in one school district led us to Japanese lesson study, we were concerned with several challenges that might affect the success of this professional development model: limited time for teachers to meet; a lack of curriculum articulation between the research lesson and what was happening in the teacher's classroom at the time; and limited opportunities for teachers to develop research and facilitation skills. How could the strengths of Japanese lesson study be effectively translated into a doable, workable model for American professional development? Our response was to develop Lesson Link™ as a new model for teacher learning in the Santa Monica-Malibu Unified School District (SMMUSD). Lesson Link extracts the core components of lesson study (collaborating around lesson design, observing classroom practice, and knowledge sharing with the professional community) and fuses them with practical, time-sensitive structures for building teachers' capacity for job-embedded research in collaborative, facilitated settings. This paper reports on our first two years of implementing Lesson Link with over 120 teachers in the Santa Monica-Malibu Unified School District in Southern California. The development, implementation and coordination of Lesson Link are part of our duties within SMMUSD's Department of Educational Services, and partially funded by a grant from the RGK Foundation.

Theoretical Framework

The development of Lesson Link is anchored in four core ideas. First, effective instruction requires sound pedagogical content knowledge. Teachers develop their pedagogical content by co-constructing knowledge through collaborative conversations. Teachers enhance this new knowledge by engaging in reflective practice. Finally, teachers develop skill as teacher-researchers and facilitators by participating in these collaborative and reflective apprenticeship models.

Pedagogical Content Knowledge

Pedagogical content knowledge (Shulman, 1986) refers to the content expertise a teacher has within a specific discipline. In other words, how do teachers fuse what they know about content and what they know about teaching to provide clear and relevant information to students? Pedagogical content knowledge incorporates a teacher's insights regarding how new knowledge should be taught, what makes learning difficult or simple for students of diverse age levels and abilities, what anticipated misconceptions students will have, and how they can be redirected. Pedagogical content knowledge requires that teachers understand the diverse learning needs of their students and have deep enough content knowledge that they can alter instruction "on the fly" and be flexible and responsive to the differing needs of their students. The expert teacher understands how to reframe a question, provide a visual example, or re-teach a strategy to maximize student learning. In-depth content knowledge is as essential to effective instruction as teaching processes; if teachers do not know their content well, it becomes impossible to teach the content to others (Shulman, 2002). In fact, Shulman argues that teacher content knowledge is the "missing paradigm" in the ongoing quest to improve teacher practice (Shulman, 2002). How then do teachers acquire pedagogical content knowledge in their respective disciplines?

Collaboration and Co-Construction of Knowledge

Vygotsky (1978) theorizes that knowledge is co-constructed and individuals gain new learning through dialogue with peers. Building on the work of Vygotsky and sociocultural theorists, Lambert (1995) posits that, "Adults learn through the processes of meaning and knowledge construction, participation and reflection" (p. 29). As a group of adults work together in a "trusting environment" (p. 36), they are able to let old assumptions go and form new beliefs and meanings. "Reflective dialogue" (p. 28), Lambert argues, helps adults develop complexity in their thinking and tolerance for diverse points of view. Professional colleagues need opportunities to interact regularly for this growth

to occur. One key to deepening pedagogical content knowledge, therefore, is to provide teachers with a collaborative structure in which to make sense of content and to explore why understanding breaks down for their students. While this meaning-making can happen in isolation, it is more likely to happen in the context of professional relationships where schemas, perceptions and beliefs can be scrutinized and challenged (Lambert, 1995).

Reflective Practice

Acquiring pedagogical content knowledge also requires time and space for reflection. Teachers need a safe environment in order to examine their beliefs and assumptions about teaching in relation to what actually happens in their classroom (Argyris, 1993; Argyris & Schon, 1974). Dewey (1910/1991) states that reflection involves embracing the unknown, generating questions from experience, and considering and testing hypotheses. Engaging in active reflection provides the very foundation of thinking and learning. Part of this reflection involves grappling with challenging issues, such as why students are having difficulty. As Dewey explains, "To maintain the state of doubt and to carry on systematic and protracted inquiry--these are the essentials of thinking" (Dewey, 1910/1991, p. 13). Reflection allows teachers to analyze and learn from their experience, adjust espoused theories, and recognize the disconnect between an espoused theory and classroom practice (Osterman, 1990). Yet, American teachers rarely feel they have the time to reflect on lessons taught, student work and implications for their future instruction (Campbell, 2003). In order to develop pedagogical content knowledge, teachers need time and space for reflection within a collaborative and constructivist structure.

Situated Learning

While collaboration and reflection about pedagogy and content are essential to deepening instructional practices, they are not sufficient for developing sustainable skills as teacher-researchers or for becoming facilitators of colleagues in these collaborative structures. According to Lave and

Wenger's (1991) theory of situated learning, teachers need opportunities for "legitimate peripheral participation" in communities of practice, where they can learn what it means to be a researcher of one's own classroom, and where they can observe more-expert others facilitating the group process. As an apprentice observes and assists the journeyman, teachers who are authentic participants in professional learning communities learn to research and facilitate through a scaffolded process. As they observe others, they gradually take on more difficult roles (Morrell, 2003). Through the process of observing and being observed, teachers learn to collect and analyze data (e.g., student work, observation notes), test hypotheses regarding student understanding, and draw conclusions based on evidence. By participating in a facilitated group process, teachers begin to gain experiential knowledge they will use when they become facilitators for similar group experiences in the future.

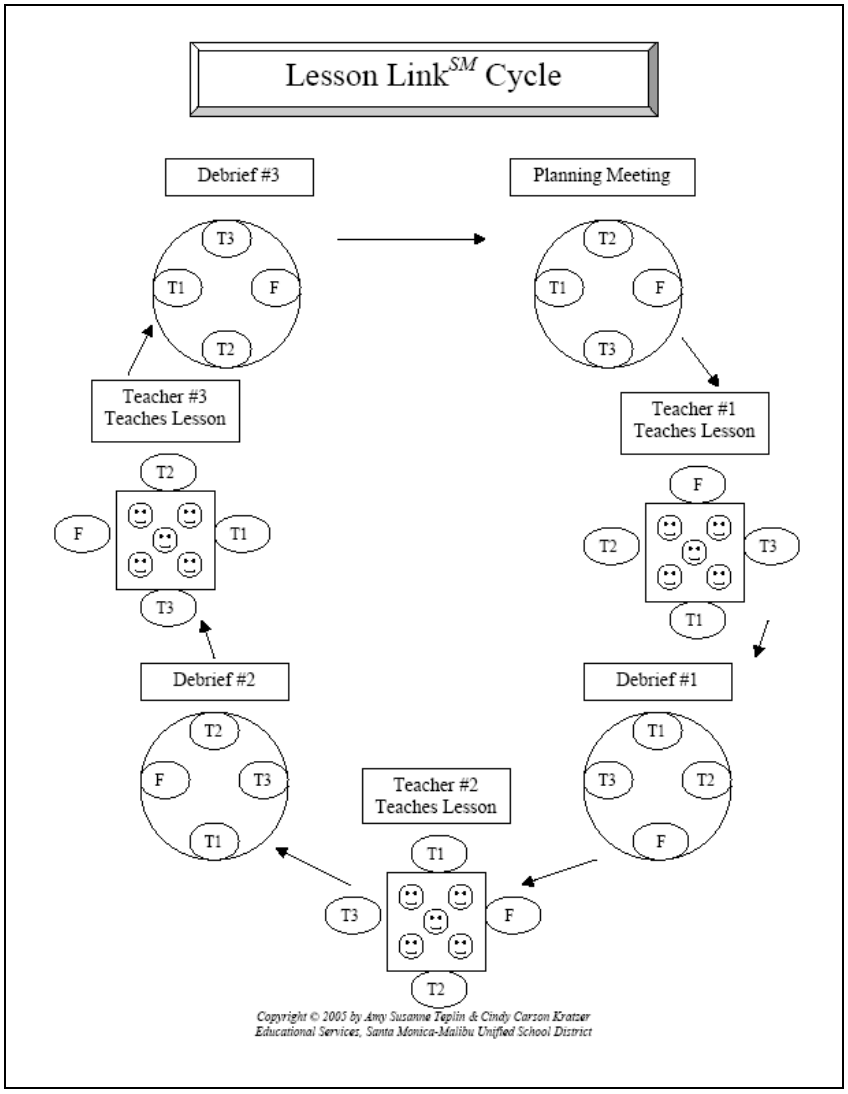
The Lesson Link model described in this paper is built on the foundation of collaboration, reflection, and legitimate peripheral participation toward fostering pedagogical content knowledge, research skills and facilitation skills among its teacher participants.

Lesson Link™

The Lesson Link™ professional development model was developed to bridge the gap between the promise of Japanese lesson study and the practical needs of American classrooms and culture. As in lesson study, small teams of teachers within and across school sites co-construct a lesson based on student needs, observe each other teaching the lesson, then debrief and revise the lesson after each observation. However, in Lesson Link, this cycle occurs over the course of one or two instructional days, rather than months. Teachers are released from their classrooms to observe each other teach a single lesson co-constructed by the group. After each demonstration, the group convenes to deconstruct the observation and refine the lesson before the next member teaches it to his/her own students. All members of the Lesson Link team (with the possible exception of the facilitator) teach the lesson on the same day (see Figure 1). The final, revised lesson is then published on the district

website and used within grade-level teams during professional development time. Lesson Link focuses on discovering where instruction succeeds and falters (based on data collected from student work samples) and looks for patterns that can be applied to future lesson design and instruction.

Figure 1



The Lesson Link™ model begins with a facilitator trained in the use of Lesson Link protocols and facilitation strategies. The facilitator may be a district professional developer or a teacher at the site. Facilitators recruit two or three colleagues from the same subject area or grade level to be on a Lesson Link team. After a district-wide Lesson Link orientation, the team sets content-area goals for three Lesson Link cycles. Lesson planning meetings are held after school and range from 2 to 4 hours

in length. Participating teachers receive a stipend for these additional hours. On the Lesson Link day, all teachers are released from their classrooms for the entire day. The co-planned lesson is taught three times (by three different teachers), with 45-60-minute debriefing sessions following each lesson. These debriefing sessions allow time to discuss what worked with the lesson, analyze student work and observation data, and determine what changes need to be made before the next lesson is taught. The final debrief includes a discussion of implications for future lesson design and instruction, and a confidential written reflection on the Lesson Link process itself. Teams complete three Lesson Link™ cycles during the course of the school year, generally one to two months apart.

In Year 1 of implementation (2005-2006 school year), 27 teachers participated in 10 Lesson Link teams at 6 schools (see Table 1). These teams were led by district professional developers (central office administrators and teachers on special assignment).

Table 1: Year 1 (2005-2006) and Year 2 (2006-2007) Lesson Link Overview

	Year 1	**Year 2**
Number of Teams	10	28
Number of Teachers	27 *(plus 3 in pilot)*	68 (plus 26 teacher-facilitators)
Number of Elementary Schools	4 of 10 1 pilot	10 of 10
Number of Secondary Schools	2 (1 middle, 1 high) of 6	4 of 6
Grade Levels	K-5, 7, 9	Pre-K - 10
Subject Areas	• 7th grade Science • 9th grade Freshman Seminar • Elementary Reading • Elementary Writing • Elementary Math • 9th, 10th grade English	• 8th grade Science • 8th, 9th, 10th grade English • 9th grade Freshman Seminar • Elementary Math • Middle School Math • Elementary Social Studies • Elementary Writing • Preschool Literacy (Special Education)
Number of Facilitators	• 5 District Professional Developers • 4 teachers on special assignment (Mentor Coaches)	• 5 District Professional Developers • 1 teacher on special assignment • 25 classroom teachers

In the summer prior to Year 2, 29 teachers participated in a two-day institute to become Lesson Link™ facilitators. These teacher-facilitators were drawn from three categories: teachers who had participated in Lesson Link in Year 1, teachers who had achieved National Board Certification and were recommended by their site administrator, and teachers who had participated in an in-depth inquiry and coaching model funded by the Cotsen Family Foundation (i.e., *The Art of Teaching)*. In Year 2 (2006-2007 school year), there are almost 100 teachers participating in 28 Lesson Link teams at 14 of the district's 16 school sites (see Table 1).

The 28 Teams in Year 2 were facilitated by Year 1 participants, National Board Certified Teachers, other teachers who had received in-depth coaching, and district coordinators (see Table 2). Four teams were led by co-facilitators, who alternated the facilitation responsibilities.

Table 2: Year 2 (2006-2007) ***Teams and Facilitators***

YEAR 2 FACILITATORS	**LL Teams Facilitated by a Single Teacher**	**LL Teams Co-Facilitated by 2 Teachers**	**LL Teams Facilitated by a District Professional Developer**
TOTALS:	**18**	**4** (**8** co-facilitators)	**6**
Teacher-Facilitators who were **Year 1 Participants**	**11**	**2**	
Teacher-Facilitators who are **National Board Certified Teachers** (but did not participate in Year 1)	**4**	**6**	
Teacher-Facilitators who participated in **In-depth Inquiry/Coaching**	**3**		

Fifty percent of the teacher-facilitators in Year 2 were Lesson Link™ participants in Year 1. Thirty-nine percent of Year 2 Facilitators were National Board Certified Teachers who had not participated in the model during Year 1. The remaining eleven percent of teacher-facilitators participated in an in-depth inquiry/coaching model, but did not participate in Lesson Link™ during Year 1.

Study Design and Description

In order to examine benefits to and changes in teachers' instructional practices, lesson design, collaboration, reflection about student learning, and skill in facilitation through Lesson Link™, we documented the implementation and expansion of Lesson Link through a mixed-methods action research study. The study also sought to identify and address supports to teacher change in instruction, lesson design, collaboration and reflection. Our research questions thus include the following:

1. According to participating teachers, how does participation in Lesson Link™ impact teachers' lesson planning and instruction?
2. According to teachers, how does participation in Lesson Link™ alter group processes among teachers, if at all?
3. How does student achievement in classrooms of Lesson Link™ teachers compare with student achievement in classrooms of non-Lesson Link teachers at their site in the content area that was focused on by the Lesson Link™ team? (e.g., if the LL team focused on reading comprehension, how did their students' achievement in reading comprehension compare to the achievement of students in the classrooms of grade-level colleagues at the site?)

Site and Sample Description

The site for the implementation and study of Lesson Link™ is a suburban school district (SMMUSD) of approximately 12,000 students. Twenty-four percent of district students qualify for Free/Reduced-Fee Lunch and fourteen percent are English Language Learners. These demographics, however, mask tremendous diversity across school sites. Four of the district's elementary schools, for example, run school-wide Title I programs with poverty rates of 50-62%. The individual school sites where Lesson Link has been implemented to date include the four Title I schools, two of which are in danger of Program Improvement, as well as more affluent schools with profiles of extraordinarily high

achievement. All district schools, except the alternative school and continuation high school, have one or more teachers participating in Lesson Link in Year 2.

Teacher participants in Year 1 of Lesson Link™ were primarily recruited by district professional developers, with varying degrees of input and encouragement from site administrators. Teachers were recruited who would potentially be able to serve as facilitators during Year 2. In the spring of Year 1, Lesson Link presentations made at a Principals' Meeting and several school sites significantly influenced interest in Year 2 participation. At several sites, participating teachers shared about the process with their colleagues at professional development meetings. Teacher participants in Year 2 were primarily recruited by the teacher-facilitators at their site, either during the summer or early fall of Year 2 (Fall 2006). Teams led by district staff were recruited through a combination of factors, including principal recommendation and district leaders' encouragement.

Data Sources

This study utilized qualitative and quantitative methods of data collection. Participating teachers and facilitators completed confidential reflection sheets following each Lesson Link™ cycle. Facilitator and teacher reflections, and lesson planning questionnaires were coded and analyzed for emerging patterns across teams and sites. A stratified random sample of ten Year 2 Facilitators (36%) participated in 1-on-1 interviews. These interviews focused on the facilitators' learning as Lesson Link participants, their experiences and learning as facilitators, and the changes they observed in their team over the course of the three Lesson Link cycles. Interviews, reflection sheets, and open-ended questions on the surveys were analyzed for trends and themes.

Quantitative data included participant surveys, facilitator surveys, and student achievement data. Participating teachers completed a Lesson Link™ questionnaire at the end of Year 1 (Spring 2006) regarding the impact the process had on their lesson design, instruction, reflection and collaboration. Facilitators completed a questionnaire following their 2-day Facilitator Training in

August 2006. Descriptive statistics were used to analyze survey data. At the elementary level, 2005-2006 student data from the classrooms of Year 1 Lesson Link participants and data from a comparison group of students of non-Lesson Link teachers at the same grade level and school site were compared using various measures. Lesson Link teams identified a content focus for their team, and where possible, the data from a district-wide or statewide assessment in this content cluster (e.g., reading comprehension) were examined and selected from the district data warehouse. The data were then compared by examining means to see if there were differences in the achievement of the students of Lesson Link teachers and those of non-Lesson Link teachers at the same grade level and school site.[1]

Guiding Principles

The Lesson Link™ team structure was created with certain underlying principles based on prior research on Japanese lesson study, the results of a professional development survey in SMMUSD, and prior experience with various professional development models in the school district. The findings from the initial SMMUSD implementation of Lesson Link are examined through the lenses of these principles and structures; therefore, a brief overview of these guiding principles is provided as background for exploring the findings.

The first foundational principle was the need to provide a trained facilitator to each teacher team, along with structured protocols and processes to guide the developing facilitator (Allen & Blythe, 2004). This facilitator might or might not have been a teacher at the site, but had to have credibility with colleagues (i.e., the facilitator had to be able to recruit colleagues to participate in the Lesson Link process). In Year 2, thirteen facilitators (42%) were Year 1 participants in Lesson Link™, ten (32%) were invited National Board Certified Teachers, three (10%) had participated in an in-depth coaching model, and five (16%) were district coordinators with experience in leading professional

[1] A similar comparison could not be done with the secondary Lesson Link teachers because there was either no comparable group of teachers at the site (e.g., the entire 7th grade science team participated in Lesson Link), or because the Lesson Link teachers were not teaching their own students for some or all of the Lesson Link process in the first year.

development. This need to have credible and trained facilitators was supported by professional development and lesson study research. In addition, the district had experienced difficulties when allowing teachers to self-identify to be teaching coaches or mentors; teachers had difficulty persuading colleagues to be coached.

To assist in the facilitation process, we provided structured protocols and training because teachers were not necessarily automatically able to transfer their teaching skills to effective leading of adult colleagues. Without the assistance of a trained facilitator who asks questions and presses the team for depth, teachers may "maintain politeness at all costs and offer superficial and tentative feedback rather than constructive criticism" (Chokshi & Fernandez, 2004, p. 523) We examined tools for making the facilitator's role, choices, thought processes and actions visible to a novice facilitator, and we created materials and protocols to guide developing facilitators and their teams through a new process. Facilitators received training in "Facilitator Moves" (Allen & Blythe, 2004), the use of protocols, and troubleshooting challenging situations.

The second principle was the importance of having all Lesson Link™ participants share in the risk of being observed teaching a lesson. Data from the SMMUSD district Professional Development Survey (Educational Services, 2006), administered in Spring 2006 to all SMMUSD teachers, indicated that 75% of district teachers were very interested in observing other teachers teaching. However, our work as district coaches had revealed that many teachers were not willing to have other teachers observe them. By creating a structure where the team consisted of teachers who would each teach the lesson, the risk for all participants was equalized. On some teams, the facilitator did not teach the lesson, but participating teachers knew that all facilitators had gone through the Lesson Link process prior to becoming a facilitator, so they had, in fact, experienced the nervousness of being watched by colleagues. Because teams could not logistically watch more than three lessons in one day, the team size needed to be small. Since all participants were teaching the lesson, all shared ownership of the

lesson's success or failure. This principle of the lesson being "our lesson," regardless of who was teaching it, was emphasized in the facilitator summer institute.

Finally, the Lesson Link™ structure focused on giving teachers the freedom to construct or revise a lesson that was relevant and timely for all teachers who participated on the team. The Lesson Link team needed to find common ground and develop lessons that all teacher participants would find helpful for their students. By tying Lesson Link to what teachers were already doing in their classrooms, there was immediate applicability of Lesson Link to the teacher's own classroom instruction. Teams decided on a content focus and agreed to teach the same lesson on the same day. This often involved making compromises regarding topic choice, sequencing, and specific content, including what came before the observed lesson, since there were no district-mandated weekly pacing plans that dictated what is taught on any given day. By giving teams the freedom to choose a lesson that was relevant for their instruction and the freedom to set their own calendar for the three Lesson Link cycles, teachers could teach lessons that were linked to their curriculum and pacing.

These intentional decisions regarding how to structure the Lesson Link™ process in line with professional development research and district culture form the foundation for the interim findings from the action research study of Lesson Link's implementation. In the sections that follow, we present the findings regarding group interaction, impact on individual teachers, and impact on student achievement.

Findings:

After implementing the principles of facilitator training and tools, shared risk, and teacher freedom to focus on their own curriculum in the Lesson Link™ model, we documented what occurred among Lesson Link teams. We discovered that Lesson Link is a transformative form of professional development. The process not only changed the way teachers interacted and taught the co-constructed

lessons, these changes were then transferred to individual teachers' planning and instructional practices in order to impact student achievement.

Transforming Group Interaction

Team Formation

Teachers were recruited to participate in Lesson Link™ by facilitators "selling" them on how Lesson Link would be different from other forms of professional development in which they had participated. Teachers would create lessons they could use in their own classrooms. They would be able to watch each other teach these lessons. The facilitator would do all the logistical work, so the teachers could concentrate on the planning and teaching. One secondary facilitator said her colleagues were convinced to participate in Lesson Link after she told them that, "They'll walk away with a great lesson for their own classroom that they'd help make."

Once the Lesson Link™ teams formed and began to meet, teachers and facilitators noted changes over time in the way the team participants interacted. There were three consistent aspects of this transformation that occurred across multiple teams. Team members began to *redefine relationships* and take risks with one another. They began to *recognize assumptions* they had about their students. They also began to *rethink planning and instruction* through their interaction with team members.

Redefining Roles and Relationships

Facilitators discussed ways in which existing roles with colleagues were altered or redefined through the Lesson Link™ process. The formal structure and use of protocols during the planning and debriefing sessions provided a way to give "all voices equal credibility," and give teachers "a *new* role that we need to really be honest and pour it all out on the table" (Secondary Facilitator). This was in contrast to prior team work where the ideas of the most experienced person weighted more heavily in the conversation. This honest dialogue allowed previously reticent teachers to "push the conversation"

(Elementary Facilitator) by voicing concerns or alternate suggestions, rather than acquiescing to the dominant voice.

Year 1 participants echoed the theme of openness between Lesson Link colleagues. They felt that their interpersonal connections were grounded in mutual respect, honesty and candor, as indicated by these quotes from Year 1 Confidential Reflections.

- "We are all very open to one another and supportive. Criticism was constructive, not uncomfortable."
- "We all know each other fairly well and get along well. We respect each other."
- "We get along well, listen to each other, respect each other's opinion."

In at least one case, however, this respect had not existed prior to the collaboration of the Lesson Link™ team. The change in relationships led to regular sharing of ideas and materials outside of the Lesson Link process, and even increased social time together. Though the teachers had been on the same grade-level team for many years, this sharing of ideas, exchange of materials, and having dinner together had never occurred before. At another school, a teacher with classroom management challenges approached her colleagues after the Lesson Link process and asked for assistance and ideas from them, something that had not happened prior to Lesson Link. "I think this year we're just really starting to get to know each other in different ways than we ever did before." (Elementary Facilitator)

For teachers not used to this level of collaboration, both being observed by other teachers and having each lesson idea analyzed by the rest of the team, the early phases of Lesson Link were often stressful. However, by the third cycle, most teachers had become comfortable with the exchange of ideas and mutual observation. On the End-of-Year Survey completed in May 2006, only 36% of the participants were very comfortable when first observed teaching by colleagues. That percentage increased to 62% by the final Lesson Link cycle. During the first cycle, 18% of teachers were very uncomfortable being observed by colleagues. In contrast, only 5% were very uncomfortable by the end of the year (see Table 3).

Table 3: Change in Comfort Level when being observed by colleagues

Comfort when being observed during 1st LL Cycle	**Comfort when being observed during most recent LL Cycle**
36% Very Comfortable 18% Very Uncomfortable	62% Very Comfortable 5% Very Uncomfortable

One elementary facilitator commented on this change, "I think that it was the comfortability factor of having done this a couple of times and not seeing anyone get maimed through the experience." A secondary facilitator noted how her team had changed in the way it was now relating. They could share more openly about frustrations and challenges in their teaching:

> I don't know that we've made changes consciously, but I think just continuing to work together naturally has evolved into being able to share more philosophically where we are with teaching these things, or being more honest about our frustrations…just by working together and trusting each other more. (Secondary Facilitator)

Another facilitator shared how much the group process helped the team to be able to take risks with the lesson:

> I think it just made it more comfortable because when we did it as *our* lesson, if it didn't work, it wasn't that *I* planned it and it failed, it was that *we* planned it and it didn't work in that context. And it wasn't about what *I* did that didn't work, it was about, oh, well, that didn't work, move on. So there was less, maybe, fear, that would be some indication of how good or poor of a teacher I would be if it didn't work. (Secondary Facilitator)

Because teachers felt the freedom to express their own ideas in a non-threatening environment, they benefited from the differing points of view raised by their colleagues. Confidential Reflections from Year 1 participants illustrate this benefit for teachers:

- "Hearing other people's ideas and visions for improvement helped to make my teaching clear."
- "We each have different strengths and pedagogical beliefs to approach math. We could borrow from one another and craft a lesson that was a part of each one of us."
- "Hearing others' ideas and opinions helps put things in perspective and clarify them in your head."

Recognizing Assumptions

In addition to changes in how team members interacted with each other, they also reported changes to their thought processes about instruction and planning within the context of the Lesson

Link™ process. This was most noteworthy in the repeated theme of recognizing assumptions teachers had about student learning. Both in elementary and secondary teams, there was an assumption going into the lesson that students would already know certain content either because of their grade-level (*they've learned this in a previous grade*) or what the teacher had already taught (*I'm sure they already know this*). Teachers and facilitators repeatedly used the words "assume" and "assumptions" to indicate how they had been incorrect and then were able to make adjustments to the observed lessons based on this new information. One secondary facilitator noted,

> We can't **assume** that, and we hear this all the time as educators, "Well, you guys covered this last year. Why don't you know it?"...We can't **assume** that they know it just because they are seniors, or because I know that you do that in middle school. (Secondary Facilitator)

This team of secondary teachers had assumed that students knew certain English content because of their grade level. Several elementary Lesson Link teams assumed that students knew background content because they themselves had previously taught it. Their assumptions, however, were proven incorrect during the Lesson Link process, as these quotes from two facilitators illustrate:

> A lot of times as teachers we make **assumptions** that they know things or that we've taught them that before, and then when we go back and we do a lesson, we realize that maybe they didn't understand it as much as we'd like…Those **assumptions** were off. (Elementary Facilitator)

> This piece on inference has been such an eye-opener for me—how we **assume** that this is so easy. I tell you [claps]—we're done …They sit there so quietly sometimes and you never know that they're totally missing what you're saying. (Elementary Facilitator)

Rethinking Planning and Instruction

In addition to redefining relationships and recognizing assumptions about student knowledge, participants also articulated transformations in their thinking about instruction as a result of co-planning with and observing other teachers. Three insights of particular importance included recognizing the value of: having sufficient time for planning and reflection, observing colleagues in making sense of their own content and instruction, and anticipating where students will have difficulty during a lesson.

Consistently, we heard from teachers that time provided for planning lessons, followed by observing and debriefing three lessons in one day, gave teachers the opportunity to think more deeply about instruction than they normally have the time to do. Six of the ten interviewed facilitators specifically mentioned the benefit of having time to plan and focus on one lesson in-depth. They contrasted this experience to other collaborative structures in which they had participated, where they worked with a grade-level team to plan a week's worth of lessons and activities. One facilitator noted that what she loved about Lesson Link™ was, "The fact that we have so much time to plan—there aren't too many opportunities you have to really look at a lesson [apart from Lesson Link], what your goal is, and really hammer it out and talk about it and develop it." The number one response to the End-of-Year Participant Survey regarding what was most beneficial about collaborating with colleagues (out of 11 choices) was "Having time to sit down and co-plan a lesson with colleagues" (36%). One facilitator contrasted Lesson Link planning with her prior collaboration with grade-level colleagues.

> There's a lot more depth in the Lesson Link planning, mostly because you're only focused on one particular lesson each time. We were trying to plan a week at a time, and then dividing up, like, who's gonna prepare this?...Who's gonna do this? So, we collaborated in that sense that we would work together…But I don't think it was to the depth of what the Lesson Link planning was. (Elementary Facilitator)

Participants clearly valued structured time for reflection and planning. Having a structure that created the opportunity to pause and examine practice closely in the middle of the classroom day allowed teachers time to be more reflective about their practice. As one facilitator explained,

> …it's all just time. Give me the time to reflect on where I am professionally, and then I can improve. If I don't have the time, and I don't have direction to do that, if I'm just supposed to be expected to do that, say, during my prep, when I'm supposed to do attendance and other things, the busy work that you do during your prep, I might not actually take the time to reflect. I might feel like, "Oh, that didn't go so well," or, "That was a great lesson," but I'm not going to figure out why. (Secondary Facilitator)

In addition to time for planning and reflection, participants recognized how much they learned about their own content and instruction from observing colleagues as another benefit of Lesson Link.

Year 1 Confidential Reflections contained many references to the value of being able to observe others teach the lesson.

- "Observing a lesson I saw things that needed to be changed, which I couldn't have predicted."
- "Being observed and observing the lesson were really valuable for improving my instructional practices. It allowed me to see and understand the concept in a different way."
- "Observing the lesson was [most valuable because] there were two pairs of eyes to make observations and reflections that are often missed by the engaged instructor."

This opportunity to observe colleagues teaching a lesson that the teacher had either just taught herself or was going to teach later proved to be invaluable for helping teachers focus on the lesson, rather than merely on the teacher or students. By analyzing the lesson across contexts, teachers could closely examine how to revise the lesson in order to better communicate the content to the class as a whole or meet individual student needs.

On the End-of-Year Survey, participants indicated that the second most valuable part of the Lesson Link cycle for them (after co-planning with colleagues) was "Making changes to a lesson and immediately trying them out in the classroom" (41%). This opportunity to observe, change, and observe again gave teachers valuable insight into how students learned and how "watching the lesson change with a few tweaks" could have an impact. Facilitators echoed these sentiments in their interviews:

> Another part that I thought was beneficial was actually when we saw each other teach. If you were the second or third person to go, and you could watch the first person, the adjustments that came out of that lesson were very beneficial. (Elementary Facilitator)

Perhaps the most significant transformation that occurred in participants' thinking during the Lesson Link process was the realization of the need to focus on where students were having difficulty. As one participant noted on the Confidential Reflection, "I thought the lesson was great until I realized all the places kids got stuck. It helped me to evaluate things I do – when I saw them being done with

another class and teacher." This team had not planned for where students might have difficulty, but they were able to recognize the problems and make changes for the next lesson.

By building into the Lesson Link™ protocol this anticipation of where students might get stuck, teachers became more adept at having remedies in place as they planned subsequent lessons. The value of this change in thinking resonated in the facilitators' interviews, as well as the Confidential Reflections and Surveys from Year 1 participants. For example, a secondary participant wrote, "I liked how we anticipated what might deviate and already had responses. Less teaching 'on the fly.'" Another participant wrote that the most valuable part of the process had been, "Thinking of potential areas where students may get stuck and using that to develop intervention strategies." Participants noted that doing this work collaboratively helped them "predict problems" they themselves would not have thought of on their own.

Forty percent of interviewed facilitators noted how much more focused their team was by the third cycle on identifying places where students might have trouble ("get stuck") and planning for those difficulties. Even in the second cycle, "There was a lot more conversation about the potential areas where they might have difficulty" (Elementary Facilitator).

In contrasting her experience in Lesson Link with other collaborative opportunities, one facilitator noted how Lesson Link gave teachers the opportunity

> to think about where and how students might get stuck. And I think that that's become a big component of Lesson Link…So, where might a student get stuck in this lesson, and then, the fix—"What are we going to think about to try and alleviate that, or to be ready to answer or respond to that?"…I think we always think about it in the back of our minds, like, "Oh, this is going to be a problem for Susie," but I think actually stopping and saying, "So what are we going to do about it?" is a big difference with Lesson Link. (Facilitator)

Even when teachers were not able to accurately predict and plan for the places students would have trouble, some of the best learning came out of situations where the lesson did not go well.

> We had one of the most wonderful conversations after our last Lesson Link because for the first time in the three times we had worked together, I felt it was really miserable in terms of how the lesson played out with the kids. And what was really interesting about that was the kind of

> conversation we had...There were times we were literally saying – "Can [these] kids even *do* analysis?" And then we would say, "No, no, no, we can't go there, we have to believe we can do this…Well, maybe we're being too linear. Like what would it look like if we were trying to break it down into stages?" Which is what our approach had been. And, "Should we be substituting something else?" And it was really great professional development because we were all so discouraged! [laughs] (Secondary Facilitator)

Facilitators reported that hearing colleagues share varied instructional strategies and approaches allowed them to approach lesson planning and design in a different way, focusing on student perspectives and differences. Rethinking their traditional planning structures led facilitators to develop richer, more inclusive lessons. As one facilitator shared,

> … I think I teach in a way that maybe if I were a learner…that's the way I would learn it. So that's the way I teach it because I'm thinking of myself as a learner. Whereas in this group situation of planning a lesson, I'm being asked by my facilitator and the other people in the group to think of other styles of learning that I sometimes forget about because I'm thinking about me as the teacher, how I would present it because I'm thinking of only me as a learner, how I would best learn that. (Secondary Facilitator)

To summarize, the Lesson Link™ process helped to transform teachers' interaction with each other, their assumptions about what students knew and could do, their recognition of the value of time to observe colleagues, and their understanding of the importance of planning for where students might have difficulty. By providing teams with trained facilitators and tools, asking all teachers to share the risk of teaching in front of one another, and giving them the freedom to choose content closely connected to their classroom practice, the Lesson Link model transformed both team dynamics and team outcomes for lesson planning and changing instructional practices.

Transforming the Way Individual Teachers Plan and Teach

In addition to changing practices during the Lesson Link cycle, participants reported a significant transfer of these changes to their ongoing classroom practice. These changes were reflected in how teachers planned and how they taught beyond the Lesson Link process.

Transforming Lesson Planning

When Year 1 Participants were asked on their End-of-Year Surveys in May 2006, *"How has participating in LL this year impacted the way you think about lesson planning/design, if at all?"* the top three themes that emerged were: teachers engaged in more reflective planning of lessons, particularly about outcomes; teachers were more focused on a single teaching point or instructional goal; and teachers were more conscious of planning for where students might have difficulty in the lesson.

As a result of participating in Lesson Link™, teachers reported that they were doing more reflection as they planned lessons apart from Lesson Link. One comment from the End-of-Year Surveys in May 2006 was typical of teachers who talked about this change: "Makes me think about the whole picture of planning—what led up to the lesson—why am I teaching this lesson." Others commented on how they were thinking more deeply, or "a few steps ahead of the way [they] might have thought about lessons in the past."

This reflection also manifested itself in greater attention to student outcomes. Several teachers reported a change in the way they assessed student learning from a lesson. Prior to their Lesson Link experience, teachers indicated that they were less concerned with concrete student outcomes. As one facilitator explained,

> The outcome of what I want my students to do or accomplish has changed. Because usually I go in knowing what *I* want and not necessarily thinking of what the kids are going to produce and if they really got it or not. So now when I'm planning my lesson I try to think what I want the kids to show me, what I want them to learn and then sort of work backwards. What are we going to have, to prove that they understood our teaching point and our objective? What facts are we going to have or what hard evidence are we going to be looking at?

Similarly, teachers reported collecting more "valuable data" and pushing for evidence to determine student mastery of content. For example, one secondary facilitator explained,

> I've changed in just trying to think ahead of what data…what's the evidence, to show that they have mastered something. How do we know that they've learned or mastered that idea? …Instead of just saying, "Okay, are you ready? All right, let's move on."

The second theme that emerged from the responses to the survey question, *"How has participating in LL this year impacted the way you think about lesson planning/design, if at all?"* was a greater focus on a clear teaching objective or goal. One respondent wrote, "I am more focused on the outcomes/objectives I want to achieve and am a bit more realistic about what I can/will accomplish." Another wrote, “I am much more conscious of what I say during a lesson and try to be very clear and focused about the objective.” This attention to the teaching point or lesson objective was a direct carryover from the planning protocol in Lesson Link™.

The third major theme emerging from the End-of-Year Survey regarding lesson design was that teachers gave greater attention to and planned for where students might have difficulty in the lesson. As we reported in the previous section, this focus on students getting stuck was evident in what happened in the Lesson Link teams, but teachers also indicated that it was transferring into their individual work as well. Repeatedly teachers wrote comments such as, "I realize the need to evaluate every lesson before and after I teach them and to make changes to continuously meet the needs of my students" or “I now think about students getting stuck.”

One teacher in particular was impacted by the idea of planning for where students might get stuck. Bill was an elementary teacher in his sixth year of teaching who had great rapport and connection with students; but his instructional practices lacked rigor. His reflections about practice were simplistic; he did not cite specific examples of where his instruction succeeded or faltered, and did not recognize where meaning broke down for his students.

During the first Lesson Link cycle, Bill struggled to keep up with the depth of analysis put forth by his team. He did not see the relevance in pre-planning for where students might get stuck during a lesson, or spending so much time on lesson planning. He admitted not spending time thinking about instruction or analyzing lesson outcomes in his own practice. He said he felt like “the weakest link” of the team, and repeatedly stated that he had “the most to learn.”

By the third Lesson Link cycle, Bill's capacity for lesson analysis had completely changed. He cited examples of where his instruction had gone awry, and articulated strategies for lesson revision. Bill asked probing questions that guided his team toward deeper levels of analysis. As Bill explained during a final debriefing conversation with his group,

> Now I understand why it's important to know when kids get stuck or unstuck. Before, I was like, "I don't know what you're talking about." Now, if we don't know when they're gonna get stuck, we don't know how to help them out, because they ***will*** get stuck.

These elements of planning for where students might have difficulty, focusing on a teaching point, and reflecting deeply on lessons and student outcomes were central parts of the Lesson Link process that began to transfer into teachers' thinking and daily practice beyond Lesson Link.

Facilitators also reported these themes in their interviews, stating how they were "thinking through where kids are going to get stuck" as part of lesson preparation, rather than re-teaching for deficits upon lesson completion. For example, one secondary teacher realized she had to build in additional lessons to prepare her students for a text-based discussion:

> I've taken away from it concrete lessons with ways of scaffolding the students to prepare for that conversation so I now know that it is at least a two-day or a three-day event, whereas before as a teacher I may have such a conversation on one day on the fly. I know that students need to be prepared for that kind of conversation. I know how to prepare for it. (Secondary Facilitator)

When Year 1 Participants were asked on their End-of-Year Surveys in May 2006, *"How has participating in LL this year impacted the way you plan for students who might struggle or get stuck, if at all?"* 91% articulated specific ways in which they were preparing more for and/or were more conscious of where students might have difficulty with the lesson. Examples included: having options available, anticipating misconceptions, modifying curricula, "breaking down each step," and planning more student-friendly directions. These comments written by two teachers reflected the tone of the entire group:

- "You ***always*** plan for their struggle rather than hoping it won't happen."

- "I never used to think that hard about it, and now this is where I spend the majority of my time when lesson planning."

As teachers began to focus more on where students were having difficulty in Lesson Link™ lessons, and to examine the assumptions they were making as a Lesson Link team, this awareness also transferred to assumptions they had made about their students. Over half of the facilitators reported that participation in the Lesson Link model led them to reexamine their assumptions about student learning. Teachers reported that they realized they planned lessons with an assumption about their students' background knowledge that was anchored in a student's grade level or prior school experience. As one elementary facilitator explained,

> I would think of the assumptions I was making that the students already knew certain things because either we had taught it or we had just assumed, "Oh, you're in 3rd grade." They should know this. And, then once it got down to a part of independent practice or working with partners and we saw where they got stuck, that was an eye-opener. So, I think it really helped me to look at the assumptions that I was making when I was teaching…
>
> I think just going through the process this year and teaching small groups…I'm teaching three…groups, so it's kind of my own Lesson Link cycle, because then I can do the lesson with my first group and I can see, "Oh, this is an assumption I made here." (Elementary Facilitator)

In summary, teachers articulated specific changes to their instructional planning which they attributed to their participation in Lesson Link. In addition, teachers reported a significant transformation in their instructional practices as a result of Lesson Link.

Transforming Instruction

The instructional changes that Year 1 Participants reported in their Confidential Reflections included: changing their lesson delivery; listening more and talking less; and focusing the instruction, rather than trying to teach many ideas at once. One teacher who changed his/her lesson delivery discussed how critical the issue of timing was in "coherent instruction." Another teacher commented how she learned the importance of listening "more thoughtfully to exactly what my students thought versus just delivering instruction." Another was focused on getting "quickly to the point, rather than overexplaining something to students." One participant said that her application was, "Narrow your

focus! I was trying to teach too many concepts in a small amount of time." These changes in teachers' thinking directly translated into changed classroom practice.

Similar comments emerged on the End-of-Year-Survey where teachers indicated that the most common changes they made in their teaching after participating in Lesson Link™ included being clear about why they were teaching something, adapting materials to meet the needs of students, and focusing more on what students needed in order to be successful. These transformations included:

- Teaching pre-requisite skills, because "I never assume they know anything" now.
- Making modifications to lessons and materials, trying "to anticipate where students might get stuck."
- Being more focused on "what do I want students to come away with."

One hundred percent of interviewed facilitators reported that they, too, had changed their individual instruction as a result of participating in Lesson Link. Some changes that facilitators reported focused on content, such as using language that made their teaching point explicit for students, "…just letting them know exactly what they need to produce in order for it to meet our expectations." Other changes referred to a shift in instructional strategies such as "keeping my lessons short" or "giving kids the opportunity to speak," decreasing teacher talk to allow for more student-to-student interaction. These examples indicate that teachers had internalized some of the core practices of the Lesson Link process and were beginning to implement them in their classrooms.

In summary, teachers and facilitators reported that the transformational changes in lesson planning and instruction made during Lesson Link carried over into their individual instructional practice, allowing them to more effectively address students' academic needs. We now turn our attention to whether student achievement outcomes were also transformed through their teachers' participation in this new model of professional development.

Transforming Student Achievement

In order to examine changes in achievement for those students whose teachers participated in Lesson Link, we compared matched scores of student achievement from 2005 to 2006 in classrooms with Lesson Link™ teachers to those of non-Lesson Link teachers. This was only possible at the elementary level[2] because comparison groups were not available for the three secondary teams. For the seven elementary teams, we created a comparison group by selecting all teachers at that site and grade level who were not part of the Lesson Link team. For example, one school had a Lesson Link team made up of two second-grade teachers and one third-grade teacher. The comparison group included the remaining second- and third-grade teachers at that same site. For this initial analysis, we made no attempt to control for teacher characteristics such as years of experience or educational levels.

The assessments used to compare student achievement were matched to the curricular focus of the Lesson Link team. For example, if a Lesson Link team focused on reading comprehension, achievement scores on state and/or district assessments in the reading comprehension cluster were analyzed and means compared. These scores are reported in Tables 4 through 10 below.

Team 1 was a second/third grade Lesson Link team, focused on improving reading comprehension. All district second- and third-grade students took the state English Language Arts (ELA) assessment in May (*California Standards Test--CST*). Mean scores reported below are on the CST Total Scaled Score and the CST Reading Comprehension Raw Score (see Table 4).

[2] The seventh-grade science LL team included all three science teachers from one site; therefore, there was no comparable group of teachers at the site. The two high school teams were made up of teacher leaders at the site, who taught out of their content area and in classrooms that were not their own, for the purpose of participating in the Lesson Link model during Year 1. Now, in Year 2, those teacher leaders are leading teams in their own content areas, so the achievement analysis will be possible once our end-of-year assessment data is compiled.

TABLE 4: Team 1—Second/Third Grade Reading Comprehension and Total Reading Scores (*California Standards Test—CST)*

	Teacher participated in Lesson Link (N=51)	**Teacher did not participate in Lesson Link (N=156)**
Mean—2006 CST Total English Language Arts (ELA) Scaled Score	**382**	367
Mean—2005 CST Total ELA Scaled Score	366	363
Mean Gain from 2005 to 2006	**16**	***4***
Mean—2006 CST Reading Comprehension Raw Score (Number Correct)	**11.00**	10.63
Mean—2005 CST Reading Comprehension Raw Score (Number Correct)	10.23	10.65
Mean Gain (loss) from 2005 to 2006	***.77***	***-.02***

Second and third grade students whose teachers participated in Lesson Link gained 16 points in their CST Total ELA Scaled Score from 2005 to 2006, while the comparison students gained 4 points in their Mean Scaled Score. On the CST Reading Comprehension cluster, Lesson Link students gained 0.77 points, while non-Lesson Link students slightly declined.

Team 2 was a third/fourth grade Lesson Link team at a Title I school, focused on improving reading comprehension. All district third- and fourth-grade students took the state English Language Arts assessment in May (*California Standards Test--CST*). Mean scores reported below are on the CST Total Scaled Score and the CST Reading Comprehension Raw Score (see Table 5).

TABLE 5: Team 2—Third/Fourth Grade Reading Comprehension and Total Reading Scores (*California Standards Test—CST)*

	Teacher participated in Lesson Link (N=46)	**Teacher did not participate in Lesson Link (N=60)**
Mean—2006 CST Total English Language Arts Scaled Score	**371**	366
Mean—2005 CST Total ELA Scaled Score	359	371
Mean Gain (loss) from 2005 to 2006	***12***	***-5***
Mean—2006 CST Reading Comprehension Raw Score (Number Correct)	**10.67**	10.48
Mean—2005 CST Reading Comprehension Raw Score (Number Correct)	10.07	10.71
Mean Gain (loss) from 2005 to 2006	**.60**	-.23

Third- and fourth-grade students whose teachers participated in Lesson Link gained 12 points in their CST Total ELA Scaled Score from 2005 to 2006, while the comparison students had a decline in their Mean Scaled Score. On the CST Reading Comprehension cluster, Lesson Link students gained 0.60 points, while non-Lesson Link students declined .23 points. Though the comparison group actually had higher 2005 scores than did the Lesson Link group, this trend was reversed in 2006.

Team 3 was a first/second grade Lesson Link™ team at a Title I school, focused on improving reading comprehension. All district first- and second-grade students took district standards-based assessments in November and June (*Houghton Mifflin Summative Test--HM*), and the second grade students took the state English Language Arts assessment in May (*California Standards Test--CST*). Mean scores reported below are on the CST Total Scaled Score and the CST Reading Comprehension Score, along with the HM November and June Total percentages (see Table 6).

TABLE 6: Team 3—First/Second Grade Reading Comprehension and Total Reading Scores (*California Standards Test—CST and Houghton Mifflin Summative Test—HM)*

	Teacher participated in Lesson Link (N=30)	**Teacher did not participate in Lesson Link (N=82)**
Mean—June 2006 HM Total Percentage	**87%**	84%
Mean—Nov. 2005 HM Total Percentage	83%	83%
Mean Gain from Nov. to June	4%	1%
Mean—2006 CST Total ELA Scaled Score (2nd grade only)	**383**	375
Mean—2006 CST Reading Comprehension Raw Score (Number Correct) (2nd grade only)	**12.37**	11.73

First and second-grade students whose teachers participated in Lesson Link gained 4 points in their overall HM percentages. Second grade Lesson Link students outperformed their non-Lesson Link counterparts on both the entire CST and in the Reading Comprehension cluster, even though the groups were comparable on the first district reading assessment (HM) in November.

Team 4 was a kindergarten Lesson Link team at a Title I school, focused on improving writing instruction. The assessment given at the beginning and end of the school year is used with all district kindergarten students and assesses a variety of literacy skills, including word writing and sentence dictation. The scores reported below are the means for the total scores on the *Emerging Literacy Survey* (ELS), which has a possible 244 points (see Table 7).

TABLE 7: Team 4--Kindergarten Writing Assessment Scores (*Emerging Literacy Survey*)

	Teacher participated in Lesson Link (N=32)	**Teacher did not participate in Lesson Link (N=51)**
Mean—ELS Total Score, May 2006	**166**	149
Mean—ELS Total Score, Sept 2005	45	44
Mean Gains from May to September	**121**	105

Although the kindergarten students of both Lesson Link and non-Lesson Link teachers started the year approximately equal (one point difference), by the final assessment, the students of Lesson Link teachers scored on average 17 points higher than did the students of non-Lesson Link teachers, a difference of 7 percent.

Team 5 was a fourth-grade Lesson Link™ team at a Title I school, focused on improving mathematics achievement. All district fourth-grade students participated in the state Mathematics assessment in May (*California Standards Test--CST*). Mean scores reported below are on the CST Total Math Scaled Score (see Table 8).

TABLE 8: Team 5—Fourth Grade Mathematics Scores (*California Standards Test—CST)*

	Teacher participated in Lesson Link (N=55)	**Teacher did not participate in Lesson Link (N=37)**
Mean—2006 CST Total Mathematics Scaled Score	**360**	405
Mean—2005 CST Total Mathematics Scaled Score	371	369
Differences in Means from 2005 to 2006	***-11***	***36***

Fourth-grade students whose teachers participated in Lesson Link declined 11 points in their CST Total Mathematics Scaled Score from 2005 to 2006, while the comparison students had an increase of 36 points in their Mean Scaled Score.

Team 6 was a fifth-grade Lesson Link™ team at a Title I school, focused on improving persuasive writing. All district fifth-grade students took the state English Language Arts assessment in May (*California Standards Test--CST*). Mean scores reported below are on the CST Total Scaled Score, the CST Writing Conventions Score, and the CST Writing Strategies Score (see Table 9).

TABLE 9: Team 6—Fifth Grade Total ELA and Writing Scores (*California Standards Test—CST)*

	Teacher participated in Lesson Link (N=63)	**Teacher did not participate in Lesson Link (N=42)**
Mean—2006 CST Total ELA Scaled Score	**364**	364
Mean—2005 CST Total ELA Scaled Score	366	363
Mean Gain (loss) from 2005 to 2006	***-2***	***1***
Mean—2006 CST Writing Conventions Raw Score (Number Correct)	**13.10**	12.38
Mean—2006 CST Writing Conventions Raw Score (Number Correct)	11.89	12.00
Mean Gain from 2005 to 2006	***1.21***	***.38***
Mean—2006 CST Writing Strategies Raw Score (Number Correct)	**10.13**	10.29
Mean—2006 CST Writing Strategies Raw Score (Number Correct)	8.58	8.54
Mean Gain from 2005 to 2006	***1.55***	***1.75***

Fifth-grade students whose teachers participated in Lesson Link showed a gain of 1.21 points in the Writing Conventions Mean Raw Scores, while their counterparts showed a smaller increase of .38 points. On the Writing Strategies portion, the non-Lesson Link students had a slightly higher gain.

Team 7 was a second/third grade Lesson Link™ team, focused on improving writing. All district second- and third-grade students took the state English Language Arts assessment in May

(*California Standards Test--CST*). Mean scores reported below are on the CST Total Scaled Score, the CST Writing Conventions Score, and the CST Writing Strategies Score (see Table 10).

TABLE 10: Team 7—Second/Third Grade Total ELA and Writing Scores (*California Standards Test—CST)*

	Teacher participated in Lesson Link (N=59)	**Teacher did not participate in Lesson Link (N=177)**
Mean—2006 CST Total ELA Scaled Score	**420**	391
Mean—2005 CST Total ELA Scaled Score	401	389
Mean Gain from 2005 to 2006	***19***	***2***
Mean—2006 CST Writing Conventions Raw Score (Number Correct)	11.19	10.75
Mean—2006 CST Writing Conventions Raw Score (Number Correct)	11.89	11.16
Mean Loss from 2005 to 2006	***-.70***	***-.41***
Mean—2006 CST Writing Strategies Raw Score (Number Correct)	**7.71**	6.98
Mean—2006 CST Writing Strategies Raw Score (Number Correct)	6.22	6.51
Mean Gain from 2005 to 2006	***1.49***	***.47***

Second- and third-grade students whose teachers participated in Lesson Link showed a gain of 19 points in their overall CST English Language Arts Scaled Score (comparison group showed a 2-point gain). In addition, Lesson Link students had a gain of 1.49 points in their Writing Strategies section from 2005 to 2006, while the comparison students had a gain of 0.47 points.

In summary, students whose teachers participated in Lesson Link generally showed greater increases from 2005 to 2006 (or from the beginning of the school year to the end) than did students whose teachers did not participate in Lesson Link, although there were exceptions on a few subtests. Only one Lesson Link team (Team 5) did worse on reported measures than its non-Lesson Link comparison group. The preliminary analysis of student achievement data indicates that for students as

well as teachers, Lesson Link is a transformative process. When teachers are guided to collaborate, plan and teach differently, it does have a positive impact on student achievement.

Transforming Teams: Two Examples

Team A

Team A was composed of three elementary teachers. Two of the teachers were long-term veterans who rarely sought out opportunities for professional development. Although they frequently shared ideas with one another, they had limited experience co-planning lessons or evaluating student work. One of the teachers had several years of classroom experience, and had participated the previous year on a Lesson Link team led by a district facilitator. In addition, she had much experience being coached by peer colleagues as part of district peer-mentoring programs. Because of her familiarity with the Lesson Link and cognitive coaching models, she was recruited and trained to be a Lesson Link facilitator.

Team A elected to participate in Lesson Link in response to a mandate from their school principal for each grade-level team to participate in a structured professional development model that would guide collaborative planning time. Initially the two veteran teachers were hesitant to participate, but were subsequently "sold" on the idea by the facilitator:

> The way that I explained and sold Lesson Link was just that we would be all working together, the bulk of the work that needed to be done getting ready for the lesson, preparing for the lesson, I would do it all, so they wouldn't have to worry about anything.

In addition, although the facilitator enjoyed her previous experience as a Lesson Link participant, she reported feeling "nervous" with the prospect of guiding her colleagues through the process. Essentially, the members of Team A enjoyed a cordial but distant professional relationship; they engaged in tasks required of their grade-level team, but did not spend a great deal of time planning together as a group.

According to the facilitator, participating in Lesson Link™ transformed the working relationship of Team A. Whereas before, all three teachers were skeptical of co-planning as a group, they now recognized the value of collaboration and sought out opportunities to talk through lessons. As one participant explained on her Confidential Reflection, "It is good to share ideas and not work in isolation. Everyone does things differently. We learn so much by the way others do things – we can incorporate how others do things into our own lesson." Another participant concurred, "Working together helps the planning of a better lesson."

Furthermore, the facilitator reported that interpersonal relationships within the team had been transformed by participating in the Lesson Link model. As she explained,

> What's interesting is that we've gotten so much closer as a grade level…There's more respect going back and forth. I think they've gained respect for what I have going on in my classroom. But even more so, I have so much more respect for what they've done, what they've accomplished, and I've gotten so many really good ideas from them. And more often than not, during the week, I'll see a worksheet, or a little lesson in my box, and I'll know it's from one of them. That never happened before.

Team A's participants explained that they felt "comfortable and safe with each other" and were "open and accepting" of one another. As one of the veteran teachers shared on her Confidential Reflection, "My group made Lesson Link one of the most productive learning activities to date. The people you work with make a difference."

Team B

Team B was composed of three veteran middle school teachers. All three were committed to ongoing professional growth opportunities and had a long history of collaborating together. For many years the team met regularly to co-plan units and lessons, share materials and evaluate student work. The team expressed interested in participating in Lesson Link as a natural extension of the work they already did together. Two members of the team agreed to co-facilitate, each serving as primary facilitator for one of the Lesson Link cycle rotations.

Although Team B entered Lesson Link™ with a rich history of collaboration, participants shared that their experience with Lesson Link transformed the way they worked together. For example, one of the facilitators explained how the shared ownership over the co-planned Lesson Link lesson changed how she approached her response to team planning:

> Normally I would have been like, yeah, yeah, yeah, listening, and then kind of take the ideas and apply it to whatever I wanted to do or what I was doing. But instead, I stepped back and…let that go and said, "Sure, let's go forward with that"…It was fine and safe to do that because it was *our* lesson, it wasn't *my* lesson.

In addition, participants discussed the value of "solid facilitation with a too-familiar group." One of the unintended consequences of years spent collaborating was that the team had become locked into traditional roles and habits. While their comfort and familiarity with one another were great strengths, they also stymied the team from pushing each other in their thinking about student learning and lesson planning. As one facilitator explained,

> …whereas at times, we got too comfortable with each other and we'd fall into old roles of the person across the table just agreeing, um hum, um hum, um hum. And then another person being extra critical, devil's advocate, and then the other person trying to kind of figure out where both of them are in the circumstance. Whereas now, where there is a formal facilitator…it's not about how we fall into these old roles, but we have a new role that we need to really be honest and pour it all out on the table, there is one person facilitating and that's not necessarily the person who is correct, or knows the most, or is more experienced, but just the person who is helping the other two work through the situation at hand.

In Lesson Link, having a facilitator use formalized protocols to guide the conversation "allowed all voices equal credibility" and enabled Team A to dialogue with greater candor about lesson planning and student learning. As one participant shared, "I was able to share ideas, my thoughts and feelings, and reflect critically on the strengths and weaknesses – to better help propel our knowledge base and deeply reconnect back to our overall purpose/rationale for the lesson."

Although Team A and Team B represent opposite ends of the teacher collaborative spectrum, both were transformed by their participation in the Lesson Link model. Participants on Team A changed from spending very little time collaborating as a grade level team to recognizing the value in

co-planning and garnering ideas and insights from one another. Members of Team B, who had a great deal of collaborative experience, evolved from the comfort of traditional roles to more honest dialogue and deeper reflection about their instruction. Data from this study show that the Lesson Link™ model can transform the group process for teacher teams who are emerging as well as veteran collaborators.

Discussion

This study adds to the growing body of research that demonstrates how the right kind of professional development can improve teacher practice and impact student achievement (Cohen & Hill, 2000; Darling-Hammond, 1997; Wenglinsky, 2002). Data from our study show that Lesson Link's classroom-based and collaborative professional development structure led teachers to re-think and alter their instructional practices. Furthermore, students whose teachers participated in Lesson Link generally outperformed their peers on state and district assessments.

Much of the research on Lesson Study has focused on implementation with mathematics or science lessons (e.g., Campbell, 2003; Fernandez, Cannon, & Chokshi, 2003; Perry & Lewis, 2003; Rock & Wilson, 2005). This study demonstrates that Lesson Link can be broadly applied across content areas and grade levels. The thirty-eight teacher teams who participated in Lesson Link over the past two years focused on a wide range of curricular areas: from reading comprehension to life science, from mathematics to health. Participating teachers represented pre-school through grade ten classrooms, and included teachers working in bilingual and special education programs. A professional development model that is flexible enough to accommodate teachers in such diverse classrooms is a rarity. Data from this study suggest that Lesson Link can be successfully implemented in a wide range of settings and present a hopeful picture of how this professional development model might be broadly applied across school sites and entire districts.

We created Lesson Link with the sustainability of the model at the forefront of our thinking. We knew from prior experiences working with teacher teams, that in the absence of a facilitator,

teachers struggle with pushing each other toward greater levels of instructional analysis. We built in deliberate structures for building capacity among Lesson Link teachers and facilitators and thus were able to expand the program significantly from Year 1 to Year 2.

Our data suggest that a critical component of the Lesson Link model is to provide structures that equip teachers with the necessary skills to facilitate conversations with colleagues. In interviews and confidential reflections teachers confirmed that the presence of a trained facilitator and tools such as protocols to guide the process helped assure the new learning of the Lesson Link team.

When we developed Lesson Link, we were concerned that condensing the time frame from traditional lesson study would limit the level of reflection teachers would bring to their lesson analysis. We wondered if, in making Lesson Link fit the time and curricular demands of our district's teachers, we were compromising depth for practicality. Results from our study indicate that participation in Lesson Link can lead teachers to rethink their instruction and make significant changes in their practice after a relatively short period of time. Even participants whom we assumed might be resistant or even intractable to change articulated specific alterations they had made to their classroom instruction as a result of their Lesson Link participation.

We speculate that the collective "owning" of the group-developed lesson facilitated these changes through a shift in how teachers talk about students and their learning. In our prior experience conducting professional development across the district, we observed that students were often blamed for lesson failure. When students neglected to learn content taught by the teacher, rhetoric circulated as to students' lack of ability, motivation, or low achievement levels. In analyzing our Lesson Link data, we were surprised to see little to no evidence of students' poor performance being cited as rationale for lesson ineffectiveness. In contrast, teachers cited *their own* strengths and weaknesses with instructional delivery. Essentially, teachers' dialogue shifted from "They didn't learn…" to "I didn't teach…"

We believe that the collective ownership over the group-developed lesson, coupled with the comfort of working with trusted colleagues who shared the same risk of being observed, created a safe space where teachers could reflect honestly and speak with candor about their instructional fallibility. Through Lesson Link, teachers were able to recognize and acknowledge their held assumptions rather than shift blame toward students. More research is needed, however, to determine if the Lesson Link model significantly alters how teachers view individual students and differentiate their instruction accordingly.

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