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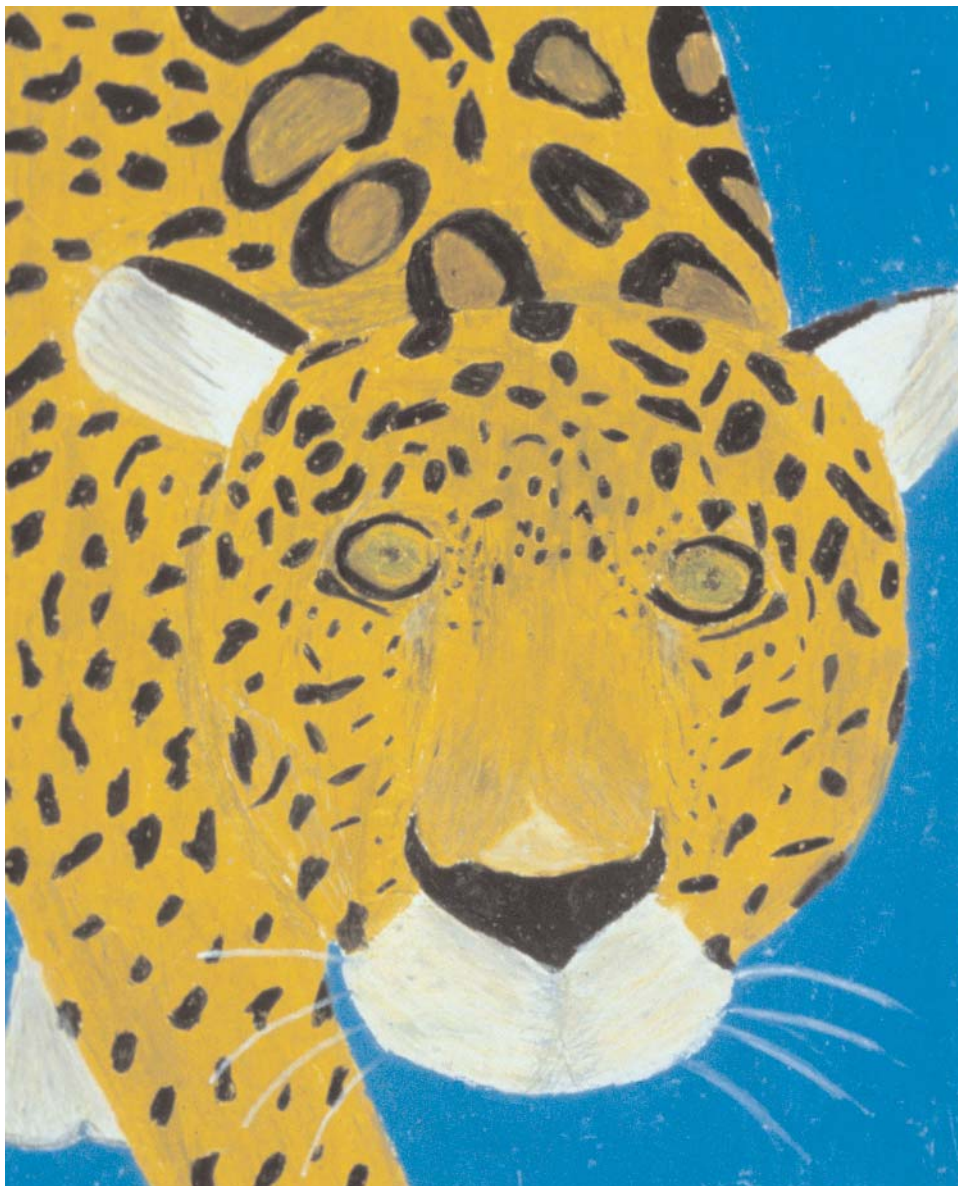
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A PUBLICATION OF THE NORTHWEST EISENHOWER REGIONAL CONSORTIUM FOR MATHEMATICS AND SCIENCE

**A MATH
AND SCIENCE
JOURNAL**

DEVOTED TO
RIGOROUS AND
IMAGINATIVE
LEARNING



**L E S S O N S T U D Y :
C R A F T I N G L E A R N I N G
T O G E T H E R**

THE ESSENTIAL ELEMENTS OF LESSON STUDY ■

RESEARCHERS IN EVERY CLASSROOM ■ LESSON STUDY ADVISERS ■

LESSON STUDY IN THE NORTHWEST



Northwest Regional
Educational Laboratory

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LESSON STUDY: CRAFTING LEARNING TOGETHER

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ON THE COVER:

Through lesson study, even the proverbial leopard may learn to change his spots! This arresting painting was done by Alyssa Gulley, a young student at Portland's Innerscape Art Center.

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THROUGH LESSON STUDY, teachers are learning to look at their own practice "with new eyes."

Two years ago, we wrote about the emergence of lesson study in U.S. schools in the Spring 2001 issue of *Northwest Teacher*, "Lesson Study: Teachers Learning Together" (www.nwrel.org/msec/nwteacher/). This Japanese practice of teacher professional development was just then crossing the ocean—and cultural expanse—to enter U.S. schools. Teachers were coming together to craft lessons, look closely at how students learn from those lessons, and return to the table to revise them to be better still.

Far more than a mechanism for creating a trove of well-honed lessons, the lesson study process reveals student thinking. For a teacher, that's like cracking "the code." Here's how it works: As a team, teachers devise a lesson, then one of them teaches it while the others observe students and take notes. Afterward, the team meets again to discuss how the lesson went and to decide whether to make revisions. Sometimes, the lesson will be retaught to a different group of students,

and the cycle of observation and debriefing is repeated.

"Japanese teachers say that the most powerful part of lesson study is that you develop the vision to see children. So you're really watching how children are learning, and learning to see things that you didn't see before: their thinking and their reactions," researcher Catherine Lewis told us two years ago.

Back then, we also talked to teachers who were forming lesson study groups. Now, we check back in with them, such as the teachers at Bellevue School District in Washington who've been doing lesson study for four years.

EDITORS' NOTE

DENISE JARRETT WEEKS

JENNIFER STEPANEK

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Art courtesy Innerscape Art Center, Portland.

We also visit North Marion Middle School in Oregon where teachers have just wrapped up their second year of lesson study.

Catherine Lewis takes a close look at the essential elements of lesson study. And we examine the critical role of the "outside expert." In an essay, teacher Jackie Hurd reveals her journey toward a deepening understanding of mathematics and a clearer view of her students' thinking.

While the ripple effect of these first ventures into lesson study continues to stir teachers across the country to come together for their own professional growth, the No Child Left Behind legislation is propelling professional development to the fore. So central is teacher quality to NCLB that it allocates \$2.8 billion for teacher preparation, training, and recruitment.

"The good news is that No Child Left Behind specifically defines the characteristics of high-quality professional development, and lesson study clearly meets the criteria," writes Jennifer Stepanek in "Researchers in Every Classroom" on Page 2.

Unlocking the door to learning is every teacher's pursuit, and some are finding a master key in lesson study. 

Our vision is that *Northwest Teacher* will serve as a tool for professional development by actively engaging readers and by speaking to them as imaginative problem solvers, thoughtful inquirers, and lifelong learners. The stories that follow were selected to inspire teachers to reflect on and talk about their own experiences and beliefs.

Professional development providers might use an article to illustrate a concept, providing time for reading and discussion. Teachers might want to share the journal with their colleagues, discussing their responses to the stories, perhaps even collaborating to try a new approach. Administrators might distribute copies to staff members, inviting them to share their reactions and reflections at a meeting or by e-mail exchanges. *Northwest Teacher* can serve as a starting point for group dialogue about issues in mathematics and science teaching, as well as for independent reading and personal reflection.



RESEARCHERS IN EVERY CLASSROOM

STORY BY Jennifer Stepanek WOODCUTS COURTESY OF Innerscape Art Center

LESSON STUDY CAN HELP teachers to see their classrooms through a research lens. The process has the potential to transform schools into places where teachers can investigate and verify what works for their students.

The educational landscape has changed significantly since we first wrote about lesson study two years ago, in the Spring 2001 issue of *Northwest Teacher*. The impact of No Child Left Behind is in the beginning stages, but already it is changing the atmosphere in schools. The demands for accountability, for evidence of teacher quality, and for research-based programs has an effect on everyone involved

in education, from preschool to graduate school, and even on this publication.

One of the foremost questions is how does lesson study fit into an educational world driven by No Child Left Behind? The success of lesson study in the United States is likely to depend on how well it can help schools answer the demands of the federal legislation.

high quality learning

A place to begin mapping the new terrain is with the substantial emphasis on professional development in the law. Title II designates \$2.8 billion for “preparing, training, and recruiting high quality teachers” (U.S. Department of Education,

2002). While virtually all of this money can be spent on professional development, there are no requirements that the money must be spent on learning opportunities for teachers. Districts will be able to use Title II funds for other priorities, such as reducing class sizes (Richardson, 2002).

Title II also supports professional development by specifically defining the characteristics of high-quality learning experiences for teachers. Lesson study clearly meets the criteria. According to the law, professional development activities must be “high quality, sustained, intensive, and classroom-focused” (U.S. Department of Education, 2002). This definition closely matches the standards and prin-

principles of good professional development that have been identified by research in the field (Hawley & Valli, 1999; National Staff Development Council, 2001).

An additional provision of Title II requires that professional development funded with Title II dollars must be based on a review of scientific research that provides evidence of a direct link to improved student achievement. Unfortunately, such research is still relatively rare for professional development because such a connection is difficult to prove convincingly (Sykes, 1999).

This shortage of evidence is especially acute in the case of lesson study. The strategy is simply too new in the United States for such research to exist. Pioneers in the use of lesson study in this country are still learning how to do it effectively. Until there is more knowledge in this area, it will be premature to expect a documented link to gains in student achievement.

Nevertheless, the existing research on professional development provides a strong rationale for lesson study. For example, lesson study applies the core features of professional development that have demonstrated the strongest impact on changing teachers' practice (Garet, Porter, Desimone, Birman, & Yoon, 2001). Lesson study focuses on content knowledge and other issues directly relevant to teachers' work. It provides active learning opportunities such as discussing, planning, reflecting, and practicing. It creates a coherent program for professional

development based on goals and standards for students. Lesson study incorporates other qualities of effective professional development—it is collaborative, teacher-led, focused on specific tasks of teaching, and it is sustained over time (Corcoran, 1995; Darling-Hammond & McLaughlin, 1995; Hawley & Valli, 1999; National Staff Development Council, 2001).

research to inform practice

Through No Child Left Behind, the U.S. Department of Education and Congress are making an unprecedented investment in the idea that scientific research is the path to improving

matter how rigorous the methods used, an undisputed body of knowledge will be elusive. Students, learning, and teaching are simply too unpredictable. This is an additional challenge of any efforts to improve the quality and use of educational research.

Because there will never be an accumulation of evidence that will tell teachers exactly what they should do from day to day, from minute to minute, it is essential that teachers know how to learn from their practice (Ball & Cohen, 1999). Learning to teach is an ongoing process. It does not end when teachers leave school or when they gain a certain amount of experience.

“LESSON STUDY IS NOT A VEHICLE FOR CREATING A LIBRARY OF TRIED-AND-TESTED LESSONS FOR TEACHERS TO BORROW FROM A SHELF AND IMPORT INTO THEIR OWN CLASSROOMS. IT IS A PROCESS FOR CREATING DEEP AND GROUNDED REFLECTION ABOUT THE COMPLEX ACTIVITIES OF TEACHING THAN CAN THEN BE SHARED AND DISCUSSED WITH OTHER MEMBERS OF THE PROFESSION.”

**— CLEA FERNANDEZ AND SONAL CHOKSHI,
COLUMBIA UNIVERSITY**

education. Many applaud these efforts to cultivate the field of educational research and to encourage the use of instructional practices that are based on empirical evidence.

While research does inform teachers' work, it will never be able to fully prescribe teaching practice. No matter how much research is conducted, and no

The current emphasis on using data and evidence to inform educational practice and concentrating on results for students is very congenial to the lesson study process. It focuses teachers on the results of their actions and dialogue with students. It provides a process that teachers can use to learn from their practice, verifying the effectiveness

of their methods and identifying less-effective routines.

Harvard Professor of Educational Leadership Richard Elmore (2002) points out that schools are not designed to be places where teachers can engage in continuous learning and improvement. Teachers are therefore very limited in their ability to respond to performance-based accountability. Teachers need opportunities to investigate the connection between their practices and student performance—a perfect fit for lesson study. The accountability measures that are included in No Child Left Behind suggest that investing in the knowledge and skills of teachers and providing them with opportunities to engage in lesson study is imperative to the future of public education.

lesson study as research

In an article in *Educational Researcher*, a journal published by the American Educational Research Association, James Hiebert, Richard Gallimore, and James Stigler propose lesson study as a means of transforming teachers' informal knowledge into professional knowledge that is public, sharable, accurate, and verifiable. Their perspective casts the process as research: "replication and observation across multiple trials" (Hiebert, Gallimore, & Stigler, 2002).

This take on lesson study is thought-provoking and may be very useful for aligning lesson study with new priorities in education. It is appeal-

ing because it gives lesson study a firm place in current policies. Nevertheless, there is tension between the concept of lesson study as a professional development strategy in which teachers build their individual knowledge about teaching, and lesson study as a research strategy with an emphasis on generating knowledge that can be applied broadly. Can lesson study do both of these things?

Changing lesson study to look more like formal research may be problematic. It may make the process less appealing to teachers and compromise some of its most powerful features. For example, as they plan, observe, and discuss a research lesson, teachers are focused on learning about their own classrooms and students. If a team is more focused on perfecting the lesson for an audience, the close attention to

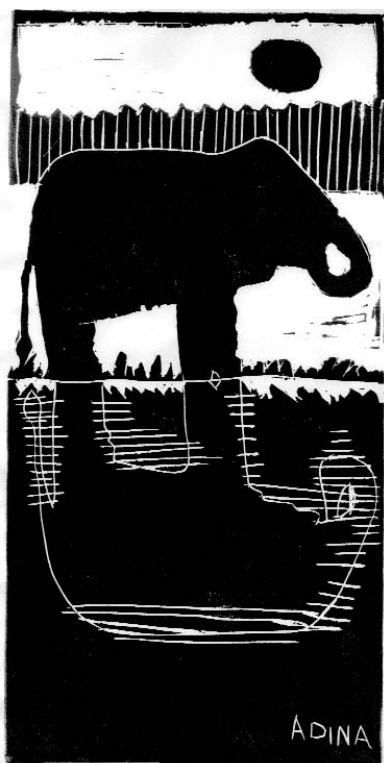
learning and students may be lost.

investigating teaching and learning


While casting lesson study as research may call for caution, there is another appealing aspect of this perspective—it honors the knowledge and work of teachers. In the push for research-based strategies and practices, teachers are rarely portrayed as sources of knowledge about teaching. Lesson study can counteract this tendency because it enables teachers to enter into this role. Through their lesson study work, teachers have a means of articulating and organizing their knowledge (Saul, 2001).

The line between professional development and research does, in fact, blur. Teachers engaging in lesson study are using inquiry to learn more about their work. It is research as a process of collaboratively creating professional knowledge through reflection, sharing, and discussion rather than proof and replication.

The role of researcher or inquirer is seldom a familiar one for teachers. One of the biggest challenges of enacting lesson study in the United States is helping teachers develop the habits of mind that the process entails. Clea Fernandez, a researcher from Teachers College at Columbia University, describes lesson study as, "a systematic inquiry into teaching practice" (Fernandez, 2002). Rather than relying on researchers to verify what works, lesson study is a means for teachers to develop and employ professional judg-



ment, honing their abilities to gather, analyze, and interpret evidence.

In our efforts to improve education for all children, teachers are far more than just an audience for research. Lesson study is a means for teachers to take an active role in generating new knowledge about teaching and learning—and, not least, igniting their passion and curiosity. Instead of looking only to experts, teachers make sense of their own practice by attending to their students and how they learn. If lesson study becomes a widespread practice in U.S. schools, it has the potential to create a researcher in every classroom. 

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WHAT IS LESSON STUDY?

Lesson study is an ongoing professional development practice in which teachers collaborate to plan, observe, and refine a lesson. While lesson study is based on educational research and theory that originated in the United States, the strategy has been implemented primarily in Japan.

The lesson study process is guided by a broad, schoolwide goal identified by the teachers. The goal often comes from looking at assessment data or defining qualities they want students to develop.

Teachers work in teams to plan research lessons and investigate questions related to the schoolwide goal. They often begin with a whole unit and then narrow their focus to a specific lesson.

One teacher from the team presents the lesson in his classroom. The other teachers observe the lesson, taking notes on what the students are doing and saying. The observations are guided by specific evaluation questions.

Later, the lesson study team and any other observers meet to discuss the lesson and their observations. This is an engaging interaction of ideas and suggestions, with the focus always on the students.

The group may meet several times to improve the lesson and prepare for a second implementation, although the teachers may decide not to reteach it. The lesson is presented again, using the same processes for observation and discussion. The teachers often publish a report about their research lesson, including the teachers' reflections and a summary of group discussions.

The Essential Elements of Lesson Study



STORY BY Catherine Lewis, Ph.D.

CULTIVATING LESSON STUDY in U.S. schools is not a matter of holding fast to the Japanese model. The power of the process resides in the key pathways through which teachers learn, grow, and improve their practice.

I recently asked a large group of California teachers how many of them had seen a promising innovation discarded before it had been given a reasonable try. Every hand went up. Teachers volunteered several reasons that innovations fail so regularly. Innovations may be “watered down” or reduced to a few ritu-

alistic activities by the time they reach local school sites. Trainers may be several generations removed from the innovation’s originators. Local educators may be pressured to implement the surface features of an innovation quickly without understanding their underlying purposes.

For the last 10 years, I have conducted research in Japan on lesson study, the core of professional development for Japanese teachers. Lesson study is credited for the shift from “teaching as telling” to “teaching for understanding” in Japanese mathematics and science education and is highly valued by both teachers and administrators. Although lesson study is rapidly emerging in sites across the United States, the history of other educational innovations should make us wary. Will lesson study be scantily implemented and quickly discarded like so many other once-promising educational innovations?

Unfortunately, lesson study and other innovations do not come with features neatly labeled “superficial” or “essential” so we know just how to implement them. Moreover, lesson study comes from Japan, so many of its features will no doubt have to be adapted for the very different

educational environment of the United States. How are we to know which adaptations are beneficial and which “lethal mutations?”

It may be tempting to think of lesson study as just a set of “recipes” or detailed procedures for planning, conducting, analyzing, and revising lessons. But lesson study is better conceived as the use of these activities to strengthen five key learning pathways:

- Increased knowledge of subject matter and instruction
- Keener “vision to see students”
- Stronger collegial and personal learning structures
- Stronger connection of daily practice to long-term goals
- Stronger motivation to improve

increased knowledge of subject matter and instruction

Lesson study begins with the study of existing curriculum and standards. Teachers discuss the essential concepts and skills to be learned, compare their treatment in existing units, consider what their students currently know and what they

need to learn, and plan a unit, with a particularly detailed consideration of the “research lesson” they will observe. As teachers study existing curricula, solve the problems to be posed to students, and anticipate and later collect data on student thinking, they naturally encounter many questions about subject matter and pedagogy:

- Why do so few students design controlled experiments? What experiences would lead students to design controlled experiments of their own accord (rather than only when reminded?)
- What objects will students think of when asked to bring in levers from daily life?
- If tweezers are a lever, where is the fulcrum?

Drawing on the knowledge of group members, written resources, and consultation with knowledgeable outsiders, successful lesson study teams increase knowledge of subject matter and instruction in ways that are immediately useful to their teaching.

Much of the learning that occurs during lesson study is applicable across the curriculum: for example, realizing that minor variations in the problem posed and the manipulatives can “make or break” the lesson, the importance of creating a hunger for scientific terminology rather than just introducing it, how to pose a good *hatsumon* (major question or problem) that will sustain students’ interest throughout the lesson and unit, or how to foster student note taking and reflection.

keener “vision to see students”

During research lessons, each lesson study team member has a data collection assignment—for example, to document how a particular student or group’s thinking about pendulums changed over the course of a lesson (or failed to), and what experiences provoked (or blocked) change. How did the materials and discussion contribute to student learning, and what changes would improve them? In addition to documenting the course of learning, data are usually gathered on student motivation, persistence, and students’ treatment of one another—reflecting the belief that classroom learning community and student motivation, as well as academic knowledge, are important predictors of future learning.

By anticipating student reactions to the research lesson and comparing these to students’ actual reactions, teachers hone their capacity to see lessons from the students’ point of view. By collecting data over an entire lesson on one student or small group and seeing the data collected by colleagues, teachers develop their knowledge of how students learn and of the supports and stumbling blocks students encounter. Developing “the eyes to see children” is, in the view of many Japanese educators I interviewed, the most important benefit of lesson study.

stronger collegial and personal learning structures

Lesson study builds a community of practice and habits of personal reflection that extend beyond the time spent in lesson study itself. As a Japanese teacher said after a research lesson: “The research lesson is not over yet. It’s not a one-time lesson; rather, it gives me a chance to continue consulting with other teachers. We teachers can better connect with each other in this way.” Another Japanese teacher said: “What’s a successful research lesson? It’s not so much what happens in the research lesson itself that makes it successful or unsuccessful. It is what you learned working with your colleagues on the way there.” The shared understandings, relationships and habits of data collection, reflection, and revision built during lesson study yield dividends throughout the school.

stronger connection of daily practice to long-term goals

Lesson study begins with considering the goals for the lesson, the unit, the academic discipline (e.g., “to think like a scientist”), and for students’ long-term development (e.g., “learn eagerly”) (Lewis, 2002). To many U.S. educators, the consideration of long-term goals feels like the essential missing piece of instructional improvement. As one U.S. teacher commented: “Lesson study focuses on the long term; usually when you’re teaching you don’t have time to think beyond the immediate

skills you want students to learn that day.” Another said, “A lot of [American] schools develop mission statements, but we don’t do anything with them. The mission statements get put in a drawer and then teachers become cynical because the mission statements don’t go anywhere. Lesson study gives guts to a mission statement, makes it real, and brings it to life.” A group of California teachers whose lesson study focused on mathematics word problems eventually came to see that many aspects of their daily instruction could foster problem-solving skills.

stronger motivation to improve

As teachers work together to gather data and improve lessons, they see problems of practice as challenges to be shared, researched, and solved. As San Mateo teacher Jackie Hurd said of lesson study, “One of the things that I really love about it is that it puts a professional part back in teaching that we have to battle for all the time... Being able to say, ‘Teaching is like a science, and we can figure these things out and get better at them.’” Successful lesson study efforts strengthen teachers’ sense of efficacy and their desire to improve. A kindergarten teacher describes, for example, how her view of her practice and of her own responsibilities changed during a two-week lesson study and geometry workshop.

“As a kindergarten teacher, I was always very focused on the standards. Of course, that was only the kindergarten state standards. ...And I always thought

‘I like teaching kindergarten because...I know enough. I don’t need to learn any math. I know enough because I teach these five year olds.’ And I just realized this week..., when I saw that first-grade example [of a lesson planned by Japanese teachers], they weren’t thinking first-grade math in their heads. They knew the standards all the way up ... I really didn’t understand the first week [of a two-week summer workshop] why we kept spending an hour or two on geometry. It was like, ‘Who cares, I’m not going to teach this in kindergarten.’ And then I realized, ‘No, I need to know the whole picture.’”

Well-designed processes of goal-setting, research lesson planning, data collection, discussion, and revision are essential to lesson study (Lewis, 2002). Together, these visible features of lesson study strengthen the key learning pathways, building in an educational setting the collective knowledge, skills, interpersonal resources, and motivation to continuously improve instruction. Lesson study is not primarily about creating good lesson plans. It is about building capacity, building the knowledge, habits, and desire to continuously improve instruction in one’s own classroom and more broadly. 🌟

Catherine Lewis is a senior research scientist in the Mills College Department of Education.

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QUESTIONS TO CONSIDER

• **How is lesson study different from the planning that my colleagues and I already do?** While planning units and activities is part of lesson study, it is only one aspect of the process. It also encompasses observing teachers and students, testing new ideas, discussing beliefs about learning, and reflecting on specific episodes of teaching. Lesson study enables teachers to learn from their practice and to share professional knowledge.

• **Is lesson study worth doing if we can only manage one cycle per year?** The lesson study process is focused on teacher learning, not on producing a certain number of lessons every year. Even one cycle can serve as a catalyst for ongoing conversations and investigations. Teachers may even find ways to extend their experiences by finding additional ways to sustain lesson study’s essential elements.

• **How will we know if we are doing lesson study correctly?** While the model used in Japan and the experiences of U.S. lesson study teams provide some guidance, there is no formula to follow. Teachers learn how to do lesson study by *doing* lesson study. In addition to reflecting on what they have learned about their students and their work, teachers need to also reflect on the practice of lesson study itself. This will help teams identify ways to maintain and enhance their work.

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THE NORTH MARION
LESSON STUDY TEAM PREPARES
TO OBSERVE A LESSON.

FROM LEFT TO RIGHT:
HEIDI FRIESEN, BILL BROWN, CHRISTIE
JACKSON, AND ANGELA TURNER. CAROLYN
DONNELLY IS NOT PICTURED.

A LESSON STUDY TEAM STEPS INTO THE SPOTLIGHT

STORY BY Jennifer Stepanek PHOTO BY Jeff Jones

NORTH MARION MIDDLE SCHOOL'S sixth-grade teachers take us behind the scenes to see what goes into staging a research lesson and to learn how it has changed the way they play their parts.

AURORA, OREGON—Carolyn Donnelly's sixth-grade students have just returned to their classroom to begin their mathematics lesson. Their teacher is trying to draw their attention to the large blue box at the front of the room, a box that will soon be revealed as "a magical mathematical candy machine."

"Can you tell me what's different about our classroom today?" she asks, hoping to pique their curiosity.

With the comic timing of a pro, a student responds: "There's

25 extra people in the room?" While this isn't the answer she was expecting, Donnelly is quick to join in the laughter of her students and the 25 "extra people."

Today's class at North Marion Middle School is special not only because sixth-grade teachers from North Marion will be observing a research lesson they have spent several months developing. Donnelly and her students are also opening their classroom to a large audience of teachers and administrators from around the Northwest. They have come to find out more about lesson study.

The North Marion teachers did not anticipate a role in the spotlight when they first contemplated lesson study a little over a year before. Yet teachers Bill Brown, Carolyn Donnelly, Heidi Friesen, Christie Jackson,

and Angela Turner were eager to tell their story and showcase the hard work that had brought them to center-stage.

setting the stage

When North Marion Principal Sharon Baum came across lesson study in the summer of 2001, she was already looking for ways to give her teachers more time to collaborate and plan together. "I wanted to take advantage of the fact that our team of sixth-grade teachers had the perfect setup, because they taught all subjects and they had self-contained classrooms," she says. By coordinating the time that students spent with specialists, Baum developed a schedule that gave the teachers 45 minutes for collaborative curriculum planning every day.

When she started reading about lesson study, Baum realized that it was a good fit with what she believed her teachers needed. When the teachers returned to school in the late summer, she introduced the idea of doing lesson study at North Marion. The teachers recall that they were intrigued but also caught off guard by what their principal was proposing. “It sounded like a good idea, but I remember being wary, because it also sounded like a lot to do. Part of me was thinking ‘Why are we the ones starting this new thing?’” remembers Heidi Friesen.

The teachers gradually overcame their uncertainty as they learned more about lesson study. In the end, it was Baum’s enthusiasm that won them over and encouraged them to give lesson study a try. “At first, I wasn’t sure because it was so different from what we thought we were going to do,” says Bill Brown. “I wasn’t sure that we were really going to have time to do it. But Sharon was so excited about it, that we just went with it.”

a close-knit ensemble

The original lesson study team at North Marion consisted of Brown, Donnelly, Friesen, Turner, and Kathy Spagel. Christie Jackson joined the group when Spagel’s teaching assignment changed to seventh grade in the fall of 2002. Each teacher brought a different set of experiences to the partnership. To make the most of their collaboration, one of the first things the teachers focused on was team building. They agree that this was an

important piece of learning how to do lesson study. By getting to know each other better and establishing a sense of collegiality, the team members developed an understanding of each other that helped them to value each others’ differences.

The collaboration that has resulted from lesson study is one of the things that the teachers value most highly about the process. As Donnelly explains, “Being able to talk together as a whole group is such a big part of lesson study. It just widens your whole perspective because you are getting ideas from other people and you’re not just going down this narrow little road of your own.”

Before beginning their first research lesson, the team devoted time to extending their knowledge of best practices in mathematics teaching. In addition to informing the teachers’ planning, their research contributed to the collaborative relationships they were developing. “The process kind of opened my eyes to different ideas,” says Friesen. “It also helped us feel a little more comfortable with each other because we each researched a topic and then shared what we learned with the team.” Thus, each team member served in the role of expert.

While simply having time to work together has nourished their cooperative spirit, the teachers believe that the lesson study process itself is key to the depth of their collaboration. “We definitely share a lot more now than we have in the past. I think it’s made us more com-

fortable with each other,” says Friesen. Christie Jackson agrees: “We are really comfortable with each other—the good, the bad, and all of that. And I would say much more so than any other group I’ve been a part of. We are much closer.”

Lesson study is different from many collaborative experiences in its focus on students, curriculum content, and classroom practice. The teachers engage in lively discussion about how to teach specific concepts in mathematics and how to help their students learn. “In normal team or department meetings I can’t think of a time where we really agonized together over the minute details of teaching,” Jackson explains. “Lesson study gives us time to do that.”

choreography of learning

The North Marion team puts a great deal of care into developing their research lessons. The heart of their planning process is doing mathematics problems and sharing their problem-solving strategies with each other. This process enables them to delve into the content they teach and to anticipate the many ways that students might approach a problem.

A breakthrough moment came the first time that the teachers compared approaches and found that they had different ways of solving the same problem. They began to consider how their students might have different approaches as well. The teachers looked carefully at how the wording of their questions

and prompts might reveal student misconceptions. They discussed how to group students for the lesson and what manipulatives might help students solve the problem.

The teachers identify this attention to instruction from the students' point of view as the aspect of lesson study that has had the most far-reaching impact on their teaching. "One of the changes I've made as a result of lesson study is anticipating how students are going to respond to my questions, and to my style of teaching," says Brown.

Turner has also found that anticipating students' reactions had a powerful influence on her teaching. "It's really helpful just to take the time to think about things that might be a problem in my lessons. It's much better to be able to do that than to always be dealing with things right on the spot." Like all of the team members, she says that this is one of the aspects of lesson study that is not limited to one lesson or even one subject area, but has improved her practice throughout the curriculum.

Over the course of a year and a half, the North Marion team completed three cycles of lesson study. At first glance, this may seem to be a small payoff for so much effort. However, the end result of their work has been much more than a handful of meticulous and tightly-scripted lesson plans. Much more important, the teachers have generated knowledge about teaching and about their students that will guide them through the more

improvisational side of teaching, as well.

an auspicious debut

Baum sees the impact of lesson study most prominently in the professional growth of the sixth-grade teachers. "This is what I got into the business for," she says. "Lesson study has really stretched the teachers. Every one of them has told me that it has made an impact on how they teach."

She elaborates on some of the specific benefits: "Lesson study has given the teachers more confidence. They've learned to collaborate and to use different kinds of data. They spend time learning about best practices and then they get to talk about them and bat around ideas. That's what teaching should be about."

Lesson study makes so much sense, says Donnelly, because it challenges teachers to do what they are trying to get their students to do: to think. The team members all report that they have become more reflective through the lesson study process. As a result, they have learned a lot about themselves and their practice. "Lesson study makes me think more about the way I teach and the kind of teacher I want to be," says Friesen.

Lesson study has inspired Jackson to think about her teaching in new ways: "I've seen this year that I'm a lot more me-centered as a teacher than I thought I was. I've always been willing to try new strategies, but I'm realizing that I've approached teaching

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QUESTIONS TO CONSIDER

• How will we select a task?

A suggested first step is to make sure that the cognitive demand of the task matches the goals of the lesson (Stein, Smith, Henningsen, & Silver, 2000). For example, if the goal is for students to think mathematically, a task focused on procedures may not be a good fit.

• What questions will the teacher ask?

A research lesson does not have to include a formal script of everything the teachers will say and do. However, planning the lesson is an opportunity to develop higher order questions that require students to think and to explain what they know (Chuska, 1995).

• How will we know if the lesson is successful?

As the research lesson takes shape, an important consideration will be defining the evidence of student understanding (Wiggins & McTighe, 1998). This will help to improve the observation data, and it is a check that the task is a good match for the lesson goals.

Chuska, K.R. (1995). *Improving classroom questions*. Bloomington, IN: Phi Delta Kappa.

Stein, M.K., Smith, M.S., Henningsen, M.A., & Silver, E.A. (2000). *Implementing standards-based mathematics instruction: A casebook for professional development*. New York, NY: Teachers College Press.

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LESSON STUDY ADVISERS

FINDING THE BALANCE BETWEEN LEADING AND FOLLOWING

STORY BY Lee Sherman ART COURTESY OF Innerscape Art Center

EVERY NOW AND THEN, A TEACHER EXPERIENCES

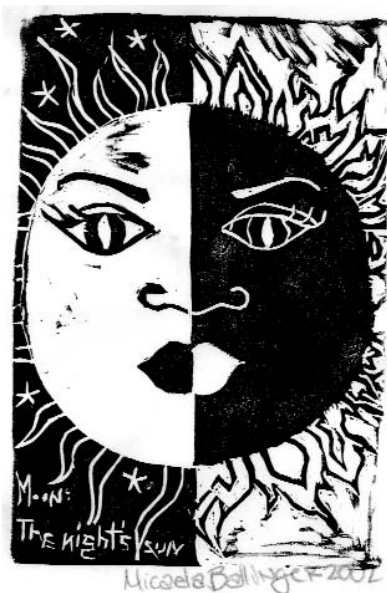
A CLARIFYING MOMENT—an instant when a slight twist of his or her perceptual lens suddenly brings a lesson into perfect focus. Middle school teacher Nick Timpone had such an epiphany during a recent lesson study

It happened one afternoon as an expert from Columbia University was critiquing a lesson Timpone and his colleagues had written. This outside adviser, who was brought in by Timpone's study team at New Jersey's Paterson Public School #2, had many words of praise for the lesson. And then, "boom!" Timpone recalls. She tossed out an insight that flipped Timpone's thinking on its head.

"It was at that point that I really understood the power of lesson study," he recounts. "Her comments were so on the money. From her comments, I saw how much better the lesson could become. All I wanted to do was to re-write and re-teach."

But the insight didn't come without a few moments of discomfort.

"You could feel the tension in the room," Timpone says.



"People were definitely uncomfortable because the comment was not positive."

This is where the skill and tact of an outside adviser can serve to nourish lesson study. To be effective, outside advisers must know just where they fit into the picture. Often, that means navigating a narrow channel between leading and following. The adviser's input is a carefully modulated blend of support, criticism, and expertise. Yet, when everything is working well, the outside adviser lets the true driving force of the endeavor—the teachers themselves—steer the boat.

knowledgeable others

Experts agree: An outside adviser can be a key player in lesson study. The adviser typically brings valuable content expertise to the mix, usually from a college or university setting. But to think of the role as simply subject-area input would be a dangerous oversimplification, according to experts in the field of lesson study. In the complex interplay of ideas and personalities that characterizes lesson study, content knowledge is just one facet. To overlook the more subtle, but equally potent aspects—the human variables that ignite (or stymie!) creativity and change—is to jeopardize the success of the process.

The range of terms applied to the role hints at its complexity. The Lesson Study Research Group of Teachers College at Columbia University identifies outside advisers as "knowledgeable others." Other terms used commonly in Japan are "outside examiner," "invited adviser," and "reactor." Tad Watanabe of Pennsylvania State University, a long-time practitioner of lesson study, describes some of the varied hats that an outside adviser might wear:

- Content specialist—Brings in a deeper and broader perspec-

tive on how the specific content under study fits into the current research lesson

- **Sounding board**—Offers a “third-person” viewpoint against which the teacher team can test its point of view

- **Cheerleader**—Bolsters the team’s confidence in their study process and reinforces their risk taking

“An outside adviser can provide a fresh perspective in familiar teaching contexts,” explains one leading expert in lesson study, Aki Murata of Mills College. “When in-school lesson study groups tend to become homogeneous over time—when teachers know and work with each other for some time to share similar ideas—having someone new adds a new point of view.”

To illustrate how to build a strong bond with a study group, Professor Watanabe tells about his own work as an outside adviser for the Thinking Mathematics program of the American Federation of Teachers. During a year-long dialogue with a study team of math teachers in Rochester, New York, the professor began with the activity he identifies as top priority: listening. In online discussions and at the first face-to-face debriefing, he mostly sopped up information and asked the occasional question.

“An outside adviser must first understand the study theme of the group, how and why they identified that particular problem, and the personalities of the members,” he stresses. “Initially, I focused on listening to the teachers’ conversation. I did not

say much, and much of what I did say was encouragement and ‘cheerleading.’”

After listening long and hard, the adviser should engage in plentiful praise. Watanabe quotes a Japanese colleague who says an outside adviser should “praise 10 and critique one”—that is, offer 10 positive comments to every critical one. “The adviser should be able to identify the strengths of the teachers and their ideas and re-affirm the validity of their ideas,” he asserts.

Now in his second year with the study group, Watanabe has stretched his role, entering more fully into the conversation as his familiarity with the team grows and their comfort level increases. And he’s careful to stress the symbiosis of the relationship. He refers to the attitude as a “learning mindset”—a sincere belief that the shared experience benefits teachers and adviser alike.

“I have made sure to express my appreciation for the opportunity to observe lessons,” he says. “That experience is very useful to me as I work with preservice teachers. I want them to know that I, too, am getting something out of the lesson study.”

apprentice advisers

As lesson study broadens its reach across the United States, the findings of local teams can spread to benefit other teams in other towns. One clear mechanism for this osmosis is the outside adviser. Sharing lesson study findings with new groups tackling similar topics is, in fact, one goal of outside advisers in Japan. But unlike Japan, where

lesson study originated and continues to flourish, the United States has only the barest beginnings of an outside adviser cadre.

What’s needed, Watanabe says, is a system for cultivating advisers with the right skills and attitudes for productive lesson study. In Japan, he says, an adviser will often take a less-experienced colleague along on a lesson study. “Such an arrangement,” he notes, “provides an opportunity for the ‘beginner’ to be apprenticed, as well as get connected with various lesson study groups.”

Timpone offers a list of the kinds of skills the adviser should bring to the lesson study experience. The outside adviser, he says, must be able to:

- Understand what the lesson writers are trying to accomplish
- Determine whether the team’s goals are being met while the lesson is being taught
- Focus comments on the content of the lesson
- Deliver comments in a way that cannot be construed as too negative
- Sum up all previous comments and bring closure to the debriefing session

Patsy Wang-Iverson of Research for Better Schools says the adviser can be instrumental in demonstrating, by example, how to dig more deeply into the learning and teaching process. The adviser can be a powerful model for the “teacher as researcher” notion that underpins lesson study.

“As part of the lesson study process,” says Wang-Iverson, “participants are learning to become researchers, learning to observe students working without succumbing to the urge to ‘teach the students.’ As teachers develop the ability to become impartial, objective observers, they learn to observe more analytically, leading to richer debriefs among themselves. At the beginning, a knowledgeable observer plays a crucial role in modeling the types of comments that lead to deeper reflection on student learning and thinking.”

Watanabe, drawing upon his extensive experience with lesson study in Japan, agrees.

“Knowledgeable others often facilitate deep discussion among lesson study participants,” he told participants at a recent conference. “This discussion may happen during the planning phase of lesson study or at the post-lesson debriefing. Either way, knowledgeable others, by asking a few key questions, often help the participants reflect.”

two-way respect

As lesson study gets a firmer foothold in the United States, the outside adviser’s role will likely take on varied shapes and hues. A key to making it work, the experts say, is matching the adviser carefully to the task and to the team. For one project, content expertise may be the big need. For another, mastery of teaching techniques. For still another, skills in facilitation.

American educators will surely put their own stamp on the outside adviser’s role as they adopt the tradition of lesson study and

adapt it to their unique needs. But care should be taken to retain one critical aspect of the teacher-adviser relationship rooted deeply in Japanese culture: respect. Watanabe stresses this point over and over.

“Knowledgeable others should not go into a lesson study group with an attitude that they are there to teach teachers,” he counsels. “Rather, they must respect teachers, children, and content, and they must be open to possible learning that may result through their interaction with other participants of lesson study.

“Knowledgeable others may possess certain expertise,” he adds. “But they must respect other participants as their equals.”

Lee Sherman is an associate editor of NWREL’s quarterly magazine, Northwest Education.

QUESTIONS TO CONSIDER

• How can I establish trust?

To create a trusting relationship in a very short period of time, advisers must consider how they can use their actions and their words to demonstrate respect and appreciation for the teachers. Careful attention to mutual trust is the key to supporting teachers as they open up their classrooms, often for the first time.

• How can I help teachers

learn? To avoid falling into the role of instructor, advisers should contemplate how they can inspire teachers to reflect on and learn from their observations. For example, it may be helpful to identify ways to phrase guiding questions or how to express suggestions as a range of possibilities.

• What can I learn from serving as an outside adviser?

Seasoned lesson study advisers approach each research lesson as a learning opportunity. The observations and conversations can provide new insights into teaching strategies, how students learn specific content, and the lesson study process itself—to name just a few possibilities. Advisers who can take on the learner role and articulate what they hope to get out of their experiences are more likely to establish rapport and trust with lesson study teams.

LESSON STUDY IN THE NORTHWEST

STORY BY Judy Blankenship ART COURTESY OF Innerscape Art Center

IN SPRING OF 2001, WHEN *Northwest Teacher* took a first look at lesson study, Bellevue, Washington, was the only school district in the region to have initiated the new professional development practice across all disciplines and grade levels. Two years later, we check in with three other regional districts where lesson study is in various stages of implementation. We also pay a second visit to Bellevue to see how the district has sustained lesson study despite budget cuts.

getting the big picture

LONGVIEW, WASHINGTON—On a recent spring day, high school biology teachers Larry Byman and Rich Cygrymus, along with Raelyn Hovig, a chemistry teacher, sat in a conference room of the Northwest Regional Educational Laboratory (NWREL) in Portland, Oregon, overlooking the Willamette River. The three were taking a day away from their classrooms at Mark Morris High School, in Longview, to begin work with NWREL researcher Veronica Zonick on their first research lesson: a difficult unit on taxonomy that Byman and Cygrymus teach their sophomores each spring.

“What’s the big picture?” Byman began. “What do we want these kids to know, and why should they care? How can we bring this lesson down to the level of the students’ lives? What grabs the attention of kids this age?”

Food, sex, and survival, the team decided, before brainstorming ideas that ranged from creating a “Fear Factor Pizza” covered with edible insects, to a taxonomy exercise Cygrymus participated in 20 years ago where students matched shoes with owners using a dichotomous key. “If it’s a good lesson, you never forget it,” he says.

A year ago, when Longview district administrators were introduced to the concept of lesson study, they immediately saw it as a professional development model that could bring needed change to the entire system, recalls Ann Cavanaugh, executive director of the Student Learning Department.

“We knew the drive-through, one-size-fits-all kind of staff development that we had been doing was failing to make changes in the classroom,” she says, “and it had become clear to us that professional development has to be embedded in real time, it has to be collegial, and it has to use the very best instructional



practice that we expect to use with our students.”

With 12 schools in the district and a high poverty rate, Longview had Title I funds available to pay teachers for release time and after-school work. When Cavanaugh and her colleague, Roxanne Stuart, director of Student Learning Support, learned about lesson study through their contacts at NWREL, they jumped at the chance to create a pilot project and forge a partnership with the NWREL’s Northwest Regional Eisenhower Consortium for Mathematics and Science.

Stuart, whose job it is to shepherd the lesson study project in Longview schools, says they are purposely starting small. In January 2003, in addition to the high school science team, an elementary math group formed. “We’re letting the pilot project be successful so those teachers will share it and spark interest in their colleagues in forming other small groups,” says Stuart. “We’ve learned in talking to others that if lesson study is forced, it does not seem to catch on. But if it’s useful and it’s making a difference, teachers will embrace it.”

putting yourself as the learner

PORTLAND, OREGON—In August 2001, Cheryl Rectanus, middle school mathematics coordinator for Portland Public Schools, brought together a small group of teacher leaders to share what she had learned about lesson study from reading *The Teaching Gap* by James Stigler and James Hiebert. “We were in our third year of implementation of the

Connected Mathematics curriculum,” Rectanus recalls, “and we were looking for ways to improve student learning, as well as de-privatize our teaching practices.”

Later that fall, at a professional development day for all middle school math teachers, a lesson study “appetizer” was served up. The response was enthusiastic, and in January 2002 math teachers from across the district were invited to create lesson study groups. Three cross-school teams formed, representing sixth, seventh, and eighth grades. Teachers took three days of release time to target a math unit and research lesson, determine the learning objectives for the students, design the lesson, teach it, observe it, and debrief it.

“The teachers liked the idea of grappling with a lesson that was hard to teach, or a lesson that was hard for students to learn,” says Rectanus, who sat in on each of the team meetings. Each group crafted a math lesson in detail, right down to scripting what the teacher would say and anticipating the responses of the students.

“After the first lesson was observed, we came back together with amazing energy and enthusiasm,” recalls Rectanus. “We saw that at some points the students responded just as anticipated, but at others they did something completely different, and that shifted where the lesson went.”

This past fall, as a way to sustain lesson study in Portland Public Schools, district leaders decided to use a National Science Foundation local systemic

change grant already in place as a “professional development pipeline.” Math and science facilitators from each school involved with the grant were introduced to lesson study and invited to take the concept back to their math and science staff. The result was the formation of five teams of middle school math and science teachers. Three have completed a lesson study cycle and two are in process.

“Lesson study reminded me that I can write the most impressive plan on paper, but if it doesn’t connect with the students it does nothing,” says Kris Goodrich, a sixth-grade math teacher. “This study made me focus on how the students might react to the lesson, and I found myself in the role of the learner, not the instructor.”

a long, slow introduction

SPOKANE, WASHINGTON—Scott Stowell, science coordinator for the Spokane School District, says lesson study was gradually introduced to middle school and high school teachers in his district within the context of a five-year National Science Foundation local systemic change grant.

“Early on, we knew we needed to be working with grade-level teams of science teachers, especially during the years where youngsters need to demonstrate proficiency at key assessment points,” says Stowell, who, with Dr. Robert Gibbs at Eastern Washington University, wrote the grant. Acquainted with lesson study from reading *The Teaching Gap*, Stowell and Gibbs saw a long-term opportunity to im-

prove the capacity of science teachers to work collaboratively to address the learning needs of students.

“In the first two years, lead teachers worked in the schools to help science teachers get comfortable with the districtwide curriculum, which includes four core units at each grade level: physics, chemistry, life science, and earth science,” says Stowell, “and through the process of planning, organizing, and preparing instruction for each unit, we laid the groundwork for lesson study without using the term.”

The next two years, science teachers looked at how classroom-based assessments can be used to monitor the quality of the students’ learning. “We introduced diagnostic, formative, and summative assessment methods, and analyzed students’ work to determine instructional approaches that resulted in improved student achievement,” says Stowell. “Again, we didn’t call it lesson study, but it was a precursor.”

In 2002–2003, the last year of the grant, lesson study was formally introduced to all grade 7–10 science teachers in the district. Separately, grade level teams from each school were provided a full day of release time to learn about lesson study protocols, and jointly to plan and design a research lesson in a core unit from their science curriculum.

“In the first cycle, teachers in the grade level teams presented the research lesson in their own schools to their own students,

while their colleagues observed,” Stowell says. “In the second cycle, the teams used a lesson from a different core unit, and took a closer look at improving their effectiveness in designing, delivering, evaluating, and improving the research lesson.”

Although generally pleased with the results, Stowell says the biggest challenge remains convincing teachers that lesson study is about bringing the expertise of the group together to design the most effective lesson possible. “For many teachers, it is a huge shift in thinking from, ‘What am I going to teach?’ to ‘What do I want students to learn, and what is it going to look like once they’ve learned it?’” Stowell observes. “Frankly, a lot of teachers haven’t yet made the shift to a student-learning focus.” The Spokane district is banking on the power of lesson study to help teachers bring about that shift.

what do we expect students to learn?

BELLEVUE, WASHINGTON—In spring of 2001, leaders in the Bellevue School District launched lesson study across all grade levels and disciplines with several decisive steps. They created stipends to train lesson study leaders, instituted early release of students one day a week to free teachers to meet in groups, and offered financial incentives to lesson study teams that developed “Blue Ribbon Lessons.”

“When we took on the lesson study initiative, we developed a template to be applied to the writing of any lesson,” says Dr. Jan Zuber, assistant superinten-

dent who supported the implementation of lesson study in Bellevue schools. “It includes the narrative objective, ‘What do you want students to know that they didn’t know before you began the lesson?’”

“In the process of learning the lesson study format, particularly writing specific lesson objectives, both principals and teachers have gotten a lot clearer about what exactly we want students to learn,” says Zuber.

When a teaching team completed a research lesson, it was reviewed by the curriculum department to make sure it met the criteria of lesson study protocol and connected with the districtwide curriculum. This step, Zuber says, added an unexpected benefit. “Often, what we thought would be a quick look and rubber stamp led to some deep and fascinating conversations about what we mean by ‘learning.’”

Lesson study has also improved the teacher observation process, according to Zuber. “Ten years ago, in doing classroom evaluations, I would typically ask a teacher to describe the activities I was going to observe in the classroom that day. Now I ask a teacher, ‘What do you want your students to learn today?’ Once you’re clear about what you expect students to learn, then you start talking about what activities will promote that learning.”

Although not all teachers in Bellevue schools chose to participate in lesson study groups, Zuber says educators throughout the district have felt the positive impact of the initiative. “I repeatedly hear

from teachers that although they cannot dedicate the same amount of time to each lesson, lesson study has caused them to think a lot more deeply about what they teach every day.”

Budget cuts this past year have meant a loss of the stipends for lesson study leaders, but Zuber is optimistic that the momentum created in the past two years will continue on a teacher-to-teacher basis. “Now, I think the most significant thing we can do is look to where there are the holes in the curriculum, to where we see students struggling, and write a lesson to address it,” Zuber says. “Last year, two fourth-grade teachers found a place in a sequential math unit

where the kids just couldn’t make the leap from one concept to the next, so they did a lesson study with a hands-on, light-bulb activity that built a bridge between the two concepts.”

Next year, Zuber hopes to formally reintroduce lesson study through workshops in individual schools. Still, she concludes, the Bellevue district has accomplished a tremendous amount in three years. “We’re all moving so fast that we often forget to stop and look in the rearview mirror to acknowledge how far we’ve come.”

Judy Blankenship is a freelance writer and photographer in Portland, Oregon.

**SPOTLIGHT,
CONTINUED FROM PAGE 11**

from my own way of thinking or of doing math. Lesson study has opened my eyes to the different ways that kids do math and so I allow more for that, instead of just looking at a question based on how I would answer it.”

In spite of their enthusiasm, Baum and the teachers are uncertain that they will be able to continue lesson study next year. Some of the team members are leaving. More problematic still are constraints that will eliminate the teachers’ common curriculum time and the possibility that they will be teaching only one subject.

Baum is searching for ways to keep lesson study going at her school. Early release days are a

possible alternative that will give teachers time to meet after the students leave. No matter what happens, the teachers’ conviction and commitment suggest that this will be an intermission rather than the finale.

“Lesson study is the best thing to happen to me in my teaching career,” says Donnelly. “Every time I do something—whether it’s on a partial level of lesson study or the whole process—I just feel really good about it. And that’s where I would like to be more often in my teaching. Because when I get excited about what I’m doing, the kids get excited about what they’re doing. There is so much learning, for all of us, that comes out of that excitement.”

Jennifer Stepanek is coeditor of Northwest Teacher.

QUESTIONS TO CONSIDER

• **How can we generate interest in lesson study?**

To develop a sustainable lesson study program, it is usually best to start small and grow from there. Identifying a core group of volunteers to pilot lesson study is more likely to result in long-term commitment. It also allows lesson study leaders to work out some of the potential problems before taking it school- or districtwide.

• **Who needs to know about our efforts?**

It is vitally important to build awareness and understanding of lesson study among everyone involved. When key people are not informed and kept up-to-date, it creates the potential for misunderstandings that will undermine the lesson study program. Make sure that teachers who are not participating understand what their colleagues are doing and why. Also, invest time in cultivating the interest of district administrators, union leaders, school board members, parents, and community members.

• **What immediate results can we expect?**

One of the key components of developing a successful lesson study program is adopting a long-term perspective. Realistically, lesson study teams are not likely to create overnight improvements in student test scores. Identifying and celebrating small changes—such as more substantial collaboration among teachers or more effective use of specific teaching strategies—will help lesson study teams to maintain their momentum.

books and materials available from THE CENTER'S LENDING RESOURCE COLLECTION

THE NWREL MATHEMATICS AND SCIENCE EDUCATION CENTER'S RESOURCE COLLECTION is a lending library of teacher-support material. Search the collection and request items from the Web site at www.nwrel.org/msec/resource/ or call (503) 275-9170. Mailing items back is at library rate.

The following titles and resources will be helpful to educators interested in lesson study.

Lesson Study: A Handbook of Teacher-Led Instructional Change
Catherine Lewis (2002)

This handbook describes both the key ideas underlying lesson study and the practical support needed to make it succeed. Topics addressed include the basic steps of lesson study, supports, misconceptions, and system impact. The handbook provides practical resources including schedules, data collection examples, protocols for lesson discussion and observation, and instructional plans.

Teacher to Teacher: Reshaping Instruction Through Lesson Study
Jan Gahala, Ruth O'Brien & Linda Schuch, Eds. (2002)

NCREL's multimedia kit is designed for teacher facilitators and professional developers to support the implementation of lesson study. The facilitator's guide includes activities, handouts, transparencies, facilitator notes, tools, and articles. The video includes an introduction to lesson study and two segments highlighting schools and teachers involved in lesson study.

Studying Classroom Teaching as a Medium for Professional Development: Proceedings of a U.S.-Japan Workshop

Hyman Bass, Gail Burrell & Zalman Usiskin, Eds. (2002)

This kit includes proceedings from an August 2000 workshop focused on using the study of classroom events to help elementary mathematics teachers improve their teaching. Participants considered lesson study as well as the use of classroom documentation and written cases. The videotape includes segments of classroom lessons and a Japanese post-lesson discussion. While not an introduction to lesson study, this resource may be interesting and useful to more experienced practitioners.

Lesson Study: Teachers Learning Together, Northwest Teacher, Spring 2001

(www.nwrel.org/msec/nwteacher/)

This issue of *Northwest Teacher* takes a look at lesson study, both in its Japanese form and as it is being implemented in this country. It introduces the process and the rationale, and illustrates how teachers and administrators around the United States are taking the first steps toward adapting and implementing lesson study.

The Lesson Study Research Group at Teachers College/Columbia University in New York

(www.tc.edu/centers/lessonstudy/)

This site provides information, resources and networking opportunities for those interested in lesson study. Resources include readings, videos and CD-ROMs, tools, and work samples. Networking oppor-

tunities include a listserv, a calendar of upcoming events, and a list of U.S. lesson study sites.

The Lesson Research Web Site
(www.lessonresearch.net/)

This site is hosted by Mills College and features the work of Catherine Lewis and her colleagues. It provides video and print materials that support the understanding and thoughtful adaptation of lesson study. In addition to information for ordering videos and books, the site includes articles, workshop handouts, lesson plans, a lesson study bibliography, and links to other Web sites.

Global Education Resources
(www.gloaledresources.com/)

Global Education Resources (GER) offers professional development and consulting in implementing lesson study. GER also offers an introduction to lesson study on CD-ROM or video.

Lesson Study Communities Project in Secondary Mathematics
(www2.edc.org/lessonstudy/)

This Educational Development Center project supports teams of secondary mathematics teachers in the Massachusetts region in implementing lesson study. Along with general information about lesson study, this site provides tools such as sample lessons, workshop materials, and team meeting materials.

AMY COYLE
works in NWREL's math and science program.

Instilling the Habit of Reflection

THE KNOWLEDGE THAT TEACHERS develop is where the real power of lesson study resides. Teacher Jackie Hurd illustrates how a single research lesson can promote deeper understanding of content, as well as new insights into pedagogy and how students learn.

During a summer workshop focused on building teachers' content knowledge in algebra and their experience doing lesson study, I collaboratively planned a research lesson. We focused on the algebra concept of writing a rule to represent a pattern as a way to devise an equation with a variable to solve for any number. The experience deepened my own content knowledge about some important algebra concepts and gave me insights into powerful teaching strategies.

The lesson was targeted for beginning-of-the-year fourth-graders. To effectively plan the lesson as a team, we needed to be clear about our understanding of the mathematical vocabulary we were to use with students. We discussed the meaning of the terms rule, pattern, formula, and equation. It became clear that we were using these terms quite loosely and inconsistently. We consulted with middle school teachers about the appropriate use of each term. This clarity of content helped us focus the goals of our lesson.

The problem we posed to students was: "How many seats will

fit around a row of any number of triangle tables?" In our first teaching of the lesson we gave students a worksheet and had them fill in the results of different numbers of triangle tables on a chart. Students were able to successfully fill in the chart and verbalize that the rule or pattern was $+2$, but they could not explain how to apply the pattern or why it grew by 2. We realized that although the worksheet enabled students to find the correct answers, it actually limited their understanding of the problem.

We revised the lesson by eliminating the worksheet, requiring students to organize the data themselves to find the rule and collaborate with four students to agree upon their data and pattern. Students shared their strategies with the class, helping others understand where they saw the $+2$ pattern on a physical representation. With this revision to the lesson, students were successful in finding the pattern and creating an equation.

In debriefing the lesson we realized the need to be more critical about using worksheets and the power of requiring the students to organize and make sense of the data. We realized that our first lesson "spoon fed" the students and misled the teacher into believing the students understood the problem because their worksheets were correct. This discussion led us

to think critically about what we mean when we say "students understand" and what we are using for evidence of their understanding. We also realized that students needed to be able to see the physical representation of the growing pattern to be able to create an equation that would work for any number. This led us into a discussion of the importance of the use of physical models in the teaching of algebra concepts.

Additionally we saw that designing a lesson in which students worked collaboratively gave them opportunities to check and refine their thinking. Likewise, our planning group benefited from an opportunity to share what we saw, refine our thinking, and deepen our understanding of student learning and effective teaching strategies.

I will continue to investigate in my classroom many of the issues raised in this lesson. Lesson study has instilled in me the habit of reflecting on how students learn, given me the chance to deepen my understanding of content, and provided me with a tool for discovering answers to the many questions that continually riddle us in the classroom.

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IN THE TWO YEARS SINCE *Northwest Teacher* first addressed lesson study, interest in the strategy and its potential effects on teaching and learning has steadily increased.

Professional development providers are adding lesson study to their repertoire, lesson study groups are forming in schools across the country, and journal articles and Web sites are offering resources and guidelines for implementation. Here at the Northwest Eisenhower Regional Consortium (NWERC), we have continued to explore lesson study with our school partners at pilot sites in Oregon and Washington. Through these pilot sites we are beginning to understand how to effectively facilitate the implementation of lesson study as a professional development approach in diverse contexts. These efforts have allowed us to begin to compile evidence regarding the power of lesson study that we hypothesized in the earlier issue on the topic.


As I read the articles for this issue, I was reminded of the two important research themes that are repeated throughout: First is the need to conduct research on lesson study in the United States to identify, document, and understand its effects on teachers' practice. The second theme points to lesson study as a vehicle for teachers to conduct research in their own classrooms to identify, document, and understand the rela-

tionship between their instructional practices and student learning.

Many are drawn to lesson study as a professional development strategy because it "just makes sense." However, in today's environment of tight budgets and rigorous accountability expectations, this isn't enough. Clearly, the educational research community must look for compelling, empirical evidence to

aspects of lesson study will be trivialized or abandoned in the rush to implement and examine its impact. We will continue to explore opportunities to work with colleagues across the Eisenhower Regional Consortia Network, our school partners, and educational researchers in higher education to pursue this research agenda.

The second theme, lesson study as research, is echoed in the issue's title and is influencing how we are approaching our technical assistance services and professional development work. At NWERC, our staff has embraced the idea of using lesson study techniques to examine our own practices by trying to anticipate participants' responses

as we collaboratively plan and develop activities. We then collect data that can be examined and reflected upon to inform our future planning. Through this approach, not only are we improving our "lessons," but we are also gaining insights into how we might help teachers hone their skills as researchers. By "walking our talk" and using lesson study as research, we believe we are not only improving our own professional practice but are also learning how to best help others in their efforts to effectively use lesson study and systematically examine and improve the craft of teaching. 

A WORD FROM THE DIRECTOR

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Charcoal drawing by Kent Metcalf, 12, a student at Innerscape Art Center.

confirm the posited benefits of lesson study. Lesson study and the various U.S. adaptations of the Japanese model must be thoroughly examined using rigorous, systematic, and generalizable research approaches. We know this will take time and dollars. And as Catherine Lewis eloquently suggests in her article, there is a danger that certain

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