Lesson Study

Using Classroom Inquiry to Improve Teaching and Learning in Higher Education

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Foreword by Pat Hutchings

Good college teachers are concerned first and foremost about whether their students learn what they are taught. We want students to achieve deep knowledge of the subjects we teach and develop the complex skills, sensibilities, and habits of mind that typify a well-educated person. As classroom teachers we can chart our successes and failures, our sense of efficacy, and sometimes our mood swings in terms of whether students make good sense of what we teach each day. It is particularly gratifying when students "get it," especially when they have been struggling to learn something complex and elusive. And, it is disappointing to do our best only to find that students don't understand the basic ideas we taught.

Learning in college is a formidable task. Every day, students confront large amounts of new, complex information. We ask them to absorb and make sense of it, and use it for a variety of purposes and reasons. But the volume of information is only part of the challenge. A more fundamental issue is that learning is inherently complicated. Certainly, students who apply themselves, try hard, and study can learn a lot; but teachers know that mistakes, misconceptions, superficial understanding, and underdeveloped skills are also normal consequences of the learning process.

To underscore its complexity, consider research findings on college science learning. Studies show that undergraduates enter college physics courses with serious misconceptions about physical phenomena. They may complete their college physics course successfully, but then revert back to their former misconceptions. For example, most students—including those who studied physics in high school—believe that an object that is tossed straight into the air continues to have a force propelling it upward. Yet, after it leaves the hand of the person who tosses it, there is no upward force acting on the object. Students relearn the concept of force in their college physics courses and do well on tests. However, at the end of their college physics courses 75% of the students revert back to their initial misconception that an upward force continues to act on the object (Clement, 1982).
Misconceptions and misinterpretations are common in every field. Even when students make a good-faith effort to learn, they often stumble, misconstrue, or otherwise fall short of where we think they should be. After reviewing the research literature on misconceptions and misunderstanding across disciplines, one researcher concluded:

An ordinary degree of understanding is routinely missing in many, if not most students. It is reasonable to expect a college student to be able to apply in a new context a law of physics, or a proof in geometry, or a concept in history of which she just demonstrated mastery in her class. If when the circumstances of testing are slightly altered, the sought-after competence can no longer be documented, then understanding—in any reasonable sense of the term—has simply not been achieved. (Gardner, 1991, p. 6)

Despite our daily experience with students, we tend to know very little about how their learning takes place or how our teaching affects their learning. Our tests may reveal what students learn and don’t learn, but not the basis of their performance. In class we witness moments of learning, for example, when students make insightful remarks about the topic at hand or ask interesting questions. At other times it seems as though students have only a vague idea what the topic is—or worse, they misconstrue it. But how often during these episodes do we know what led to their insights or misconceptions? How often can we explain what aspects of our teaching supported or impeded their understanding? I have walked out of class many times wondering why it went so well or so poorly.

To help improve our practice we need to better understand how students learn, and attain more insight into the basis of their performance. We need ways to look inside the “black box” to see how students make sense of the subject matter and how our instruction supports or interferes with it.

This book is about how college faculty can better understand student learning and improve their teaching by studying individual class lessons. In this approach, known as lesson study, several instructors jointly plan, teach, observe, analyze, and refine a single class lesson. The purpose of a lesson study is to put a lesson under the microscope, to carefully analyze how students learn from our teaching and then use that knowledge to improve future performance—ours and theirs.

Why study lessons? Instructors try to improve their practice in a multitude of ways such as by updating their courses and materials, adopting new teaching practices, creating new assignments, and using alternative methods to evaluate students. But, why not improve teaching by examining the building blocks of our courses—class lessons? As teachers we devote a significant portion of our work lives to preparing and presenting lessons. Why not make lessons the object of study? As researcher Catherine Lewis (2002b) says,

Lesson study is a simple idea. If you want to improve instruction, what could be more obvious than collaborating with fellow teachers to plan, observe, and reflect on lessons?

A lesson is the place where our instructional goals come to life, where students interact with the instructor, other students, and the subject matter. From a practical standpoint, lessons are ideal for study because they are manageable units of analysis. It is easier to investigate the teaching and learning in a single lesson than in a larger curricular unit or throughout an entire course. An individual lesson has fewer goals, less content, and takes place on a single day. By focusing on a single lesson, teachers can carefully and systematically examine how instructional activities play out and how students learn from the experience. What instructors learn from studying a single lesson may be applied more generally to other areas of teaching and learning. Moreover, changing a single lesson is less risky compared to adopting a new teaching strategy to use throughout an entire course.

Although they are small segments, lessons are complex units of teaching and learning. Consider what goes into a lesson. We imbue them with important goals for learning, intend them to shape student thinking, craft exercises and assignments to bring the goals to life, enact our plans in class, and reflect on how they turn out. By studying lessons—from goals to design to presentation to results—instructors can examine the entire teaching and learning process. Through lesson study instructors collectively can

- examine their goals for student learning;
- discuss student difficulties with the subject matter;
- explore how instructional strategies can support specific forms of learning;
- create a class lesson intended to bring learning goals to life;
- investigate how students learn or do not learn from the lesson;
- observe students as they react and respond to classroom instruction;
- analyze multiple sources of evidence about student learning;
- use evidence of student learning to revise teaching; and
- document their work so that other teachers can use it, learn from it, and build upon it.

In essence, a single lesson can encompass the full substance and complexity of teaching and learning—the world of teaching in a single grain
of sand. And, by studying individual lessons teachers can develop deeper understanding of how students learn.

What does lesson study look like? Lesson study grew out of the collective efforts of classroom teachers in Asia to improve their teaching. It is particularly well developed in Japan, where it has been shaped by teachers and education specialists into a very powerful form of professional development and practitioner inquiry. The primary aims of lesson study are to improve the practice of those teachers who participate in it and to build knowledge that can be used by other teachers to improve their practice.

Because it has been molded by the needs and interests of practitioners, lesson study is different from more general models of educational research. You do not need an advanced degree to do lesson study; instead, you learn it by participating alongside experienced practitioners. Nevertheless, lesson study is not a casual, anything-goes procedure. It is a form of systematic inquiry that has well-established practices and processes.

Lesson study is a cyclical process that is broken down into a series of steps in which several instructors jointly plan, teach, and study a lesson. Figure 1 depicts the sequence of steps in the lesson study cycle. I describe them briefly in this chapter and discuss them more fully in subsequent chapters.

- **Formulate learning goals.** The first task in a lesson study is to define learning goals for a lesson. Typically, the lesson study team members select a topic of interest to them, usually one that is important in the discipline or course, one that poses problems for students, or one that is new to the curriculum. Ideally, a research lesson addresses immediate academic learning goals (e.g., understanding specific concepts and subject matter) and broad goals for development of intellectual abilities, habits of mind, and personal qualities.

- **Plan the lesson.** The team creates a lesson intended to “bring the goals to life” (Lewis, 2000). The teachers may modify an existing lesson or start anew. They share their previous experiences teaching the topic, and discuss possible ways to address the lesson goals.

- **Plan the study.** The team develops a plan to investigate how students learn from the lesson that specifies the type of evidence the team will collect and how observers will observe and record data during the lesson. Data typically consist of detailed observations of student activity and students’ written work during the lesson.

- **Teach, observe, and gather evidence.** The lesson is taught at the scheduled time during the term. One member of the team teaches the lesson and other members, and any invited guests, attend the class to observe and collect data.

- **Analyze the evidence.** Soon after the lesson is taught the team holds a debriefing meeting to examine evidence related to the learning goals and to reflect on the experience. Participants include the lesson study team members and guest observers. Participants share their observations and examine additional evidence from the lesson, such as student written work, searching for patterns that may reveal important insights into teaching practice and student learning.

- **Revise the lesson.** Following the debriefing session, the lesson study team holds one or more meetings to analyze the data more fully and discuss possible changes to the lesson and/or the study. Based on the evidence, the team revises the lesson, which can involve anything from minor adjustments to wholesale revision of the lesson.
Repeat the cycle. The team carries out a second iteration of the study, teaching the revised lesson in another class, usually the following term. Team members observe the revised lesson, collect new data, and hold a follow-up debriefing session to analyze and revise the lesson one last time. This iterative design process offers teachers a chance to explore ideas and different approaches, making evidence-based improvements as they go.

Document and share the lesson study. Teams document and disseminate their lesson studies so that other instructors can review, learn from, and build upon their work. They produce a field-tested lesson plan accompanied by an explanation of the context and the results of the investigation.

To summarize, during a lesson study instructors examine learning goals and problems students experience in a specific class. They select goals or problems of special interest and then design instructional activities—exercises, lecture, materials—intended to support students' achievement. As they plan the lesson, instructors also decide how they will observe and gather evidence of student learning. Once the lesson and the data collection procedures are set, they take the lesson into the classroom, where one member of the team teaches the class while the others observe and collect data. The team then sifts through the data and decides how to improve the lesson. Typically, teams repeat the cycle by studying the revised lesson and making final changes. The team aggregates its learning, then documents and disseminates both the lesson and the study so that other teachers can use and build upon their work.

LESSON STUDY IN PRACTICE

Lesson study has evolved into the primary means of professional development among schoolteachers in Japan, where it is so pervasive that nearly all elementary and junior high school teachers participate in at least one lesson study during the school year (Fernandez & Yoshida, 2004; Lewis, 2005; Lewis & Tsueida, 1998; Wang-Iverson & Yoshida, 2005; Yoshida, 2005). Teachers also share their work in three ways:

1. Teams write lesson study reports, which are detailed accounts of the lesson and the teams' findings about student learning. These are disseminated widely in bookstores and other outlets. It is not unusual for teachers in different parts of the country to know of one another's work.

2. Schools hold open houses—the equivalent of professional conferences—in which teachers from surrounding areas come to observe as school staff teach research lessons in their classes. Following the lessons, teachers hold a colloquium to discuss them.

3. Teachers publish their findings in educational journals. Japanese schoolteachers author thousands of articles annually (Fernandez & Yoshida, 2004).

Researchers contend that lesson study has been instrumental in helping to transform elementary-level teaching in Japan from a didactic approach based on drill and practice to a problem-based learning pedagogy, and has played a key role in elevating student achievement nationwide (Stigler & Hiebert, 1999).

These remarkable achievements prompt Western educators to wonder what kinds of cultural and educational conditions give rise to this system of teaching improvement, and whether lesson study can thrive in different cultural soil. College teachers may have even more pointed questions about whether educational practices used by Asian elementary school teachers are relevant and adaptable to American college classrooms.

Since Western educators first became aware of lesson study in the late 1990s, there have been numerous projects to introduce lesson study at the K–12 level in the United States. There continue to be thriving projects across the country and a growing research literature (e.g., Lewis, Perry, & Hurd, 2004; Lewis, Perry, Hurd, & O'Connell, 2006).

WHAT ABOUT LESSON STUDY IN HIGHER EDUCATION?

It is interesting to note that college teachers in Japan do not engage in lesson study, nor do college teachers anywhere else. Lesson study is by and large unknown in higher education.

Prior to 2003 there were only a few published accounts linking lesson study with university-level teaching. Then in 2003, inspired by the Japanese model, instructors at the University of Wisconsin–La Crosse embarked on a proof-of-concept project to try out lesson study in their classes. As project coordinator, I recruited 16 instructors and formed four teams in Biology, Economics, English, and Psychology. We started with little formal knowledge of lesson study but agreed to follow the Japanese model. Each team developed learning goals, planned a research lesson to address the goals, taught,
observed, analyzed, and refined the lesson. The following semester we did a second iteration by teaching and studying the revised lesson.

Faculty interest in lesson study spread quickly at UW–La Crosse and then to other campuses in the UW System. Between 2003 and 2010 the College Lesson Study Project (CLSP) has helped support more than 100 lesson studies involving more than 400 instructors in several dozen disciplines on campuses throughout the University of Wisconsin System.

The CLSP has demonstrated that college teachers can and will participate in lesson study. Using the Japanese approach as a model, it has adopted and adapted lesson study practices to the college level. The CLSP continues to train and support instructors to use lesson study as a way to improve teaching and learning. Although ideas about how to do lesson study continue to develop, we now have considerable experience with lesson study. Throughout this book, I will draw upon the experiences of college teachers who, with a modest amount of training and guidance, have carried out lesson studies in their classes. Their examples will help illustrate how college teachers actually do lesson study and what teachers can learn from the experience.

The aims of this book are to introduce college teachers to the theory, practice, and research on lesson study and to serve as a handbook for those who would like to learn to conduct lesson study in their classes. This book is organized around major lesson study practices—finding a focus for a lesson study, lesson design, how to study teaching and learning during a lesson, analyzing and using evidence to improve teaching and learning, and documenting lesson studies so that other teachers can use and build upon them.

Chapter 2 is a stand-alone lesson study primer that describes general lesson study processes and practices. Instructors can use this chapter as a blueprint or guideline to engage in basic lesson study.

Chapter 3 examines how instructors can form teams, select a course and topic as the context for a lesson study, and initiate a lesson study around important learning goals or student learning problems.

Chapter 4 explores unique features of planning a research lesson. There are important differences between everyday class preparation and designing a research lesson. Teachers employ a backward design process to first identify the goal of instruction and then design lesson activities to support it. Teachers plan a research lesson that makes student thinking open to observation and analysis.

Chapter 5 describes methods for observing student learning and thinking in the classroom and gathering other types of evidence. Lesson study focuses on how students learn, which makes observation an especially important source of evidence. This chapter explores the types of evidence of student learning you can collect and how to plan data collection procedures.

Chapter 6 focuses on different ways to organize and make sense of observational and written data. The goal of the analysis is to better understand how students learned or did not learn from the lesson and to use the data to improve future performance of students (evidence-based improvement).

Chapter 7 argues that a lesson study can make a valuable contribution to teaching in one's field if instructors document and disseminate their work effectively. A lesson study produces two tangible products: (a) a field-tested lesson and (b) a study that explains how students learn from the experience. Both can be valuable. Teachers can adapt the lesson to their own classes and circumstances and also learn from the study what to expect in terms of student performance.

Chapter 8 explores findings from the CLSP, and describes how college teachers have been using lesson study, what they learn from the experience, and how lesson study practices can improve teaching and learning.