



Lesson Study

~A model for professional development:
Teachers working with Interactive Whiteboards
in Mathematics~

Fields Math Forum Presentation

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What is Lesson Study?

A model of teacher-directed collaborative professional development

“The Japanese say that lesson study develops the eyes to see children.”

Richardson (2000)





What does lesson study DO?

- builds a shared body of professional knowledge, language, beliefs
 - helps teachers to focus in on their teaching practice (revealing)
 - helps teachers to ‘see’ student learning (artifacts)
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How does lesson study work?

In 2007, the PME-NA lesson study working group identified essential elements of lesson study.

I. Goal Setting: facilitator may assist in setting goals

II. Curriculum Planning: with as much support as appropriate

III. Implementation and Observation: live observation

IV. Debriefing/Reflection: formalized

(see e.g., Lewis, Perry, [Murata](#), 2006)

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graph TD; 1[1. Identify specific need and formulate curricular goals] --> 2[2. Plan]; 2 --> 3[3. Implement]; 3 --> 4[4. Evaluate]; 4 --> 1;
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1. Identify specific need and formulate curricular goals

2. Plan

- Lesson(s)
- Data collection strategies
- Rationale for the approach
- Anticipated student demonstrations of learning and thinking

3. Implement

- one member of the team teaches the lesson, other members observe and collect data

4. Evaluate

- Analysis of data collected
- Evaluation of student learning, teacher learning, content pedagogical learning
- Documentation
- Moving toward next cycle



Ideal conditions

- A. outside experts engaged PME NA, 2007
 - B. administrative support
 - C. development of trust (nexus of multi-membership - Wenger)
 - D. tackling a challenging area of math learning and teaching
 - E. focused on finding, inventing and implementing effective teaching strategies
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The KPRDSB Lesson Study

- funded through a GAINS Ministry grant
 - 4 schools; 12 teachers; 3 researchers; 1 RA
 - 2 cycles: Fall and Winter
 - focus on challenging math concepts:
 - ◎balancing equations (grd 9)
 - ◎linear functions (grd 7 & 8)
 - ◎Data management (grd 9 Essentials)
 - ◎fractions as division (grd 8 & 9)
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Data collection

- student achievement (n=300, pre and post PRIME)
- student efficacy (n=300, pre and post)
- teacher focus group interviews by team
- teacher efficacy data
- documentation of all four stages of the lesson study cycle at each school site:
 - ◎ field notes of meetings (Word - N6)
 - ◎ observations based on templates (Word - N6)
 - ◎ video footage (Transana)
 - ◎ archives (versions of lessons during development; student work samples; notebook files)



Data analysis

- embedded mixed methods design (Plano-Clark and Creswell, 2007)
 - independent analysis of quantitative and qualitative data to answer different research questions
 - then combined analysis for larger sense of effectiveness
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1. Goal setting: *identify* an area of focus

- consider what is not working / what are students struggling with?
- What are the goals for the lesson?

QuickTime™ and a YUV420 codec decompressor are needed to see this picture.





2. Curriculum design: *plan* the lesson

- teaching team collaboratively plans
- use of various resources and research to help
 - Current research
 - Math curriculum
 - Ideas from other people and print resources
 - Exploratory lessons

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3. Public lesson: *lesson implementation*

- any member of the team can implement
- others (teachers, guests, discussant) observe what is happening and collect data
- video footage is usually part of the lesson implementation for future review

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4. Debriefing: *evaluate what happened*

- teacher debrief
- observer debrief
- discussant debrief

“Lesson study practitioners can begin their post lesson reflections by focusing on what they learned from teaching the study lesson (e.g., whether or not the study lesson helped them learn about the goal they set out to explore), instead of just commenting on performance (e.g., "the lesson went really well").”

(Chokshi & Fernandez, 2004)





What next?

- After lesson analysis the teaching team needs to decide if they will:
 - (a) revise the lesson and have all teachers teach the revised lesson independently;
 - (b) have one teacher teach the revised lesson as a demonstration for all; or
 - (c) move on to the next cycle with a new focus.
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Preliminary findings

- trust & collaboration
 - ⊙ “Imagine planning all our lessons like this? It would be amazing.” (Kristen, planning meeting, Nov.)
 - focus on one lesson - affects the way teachers understand math teaching and learning overall
 - teacher engagement: self-directed
 - ⊙ e.g., teachers at Port Hope HS - PD session for the grade 7 & 8 teachers in the feeder school;
 - LIVE lesson at conference in February 12 & 13
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SB continuum of use

Instructions to the class using the SB as a chalkboard

Demonstration to the class using the SB as a dynamic screen

Invitation to the student to use the SB for replicating teacher model

Invitation to the student to use the SB for solving a problem provided in class

**Facilitating student mathematical discussion with use of the SB to illustrate ideas;
build on and disagree with solution strategies presented**



Teacher testimony

- Heather Hedges, Highland Heights PS in Peterborough
- presenting at conference in Toronto - GAINS Ministry Conference: Feb 12 & 13 - with video footage of each stage of the cycle



Winter cycle

- ⊙ emphasis on exploratory lessons
 - ⊙ anticipating student responses
 - ⊙ outside expert as discussant
 - ⊙ more comprehensive lesson study packages & video analysis
 - ⊙ intensified data collection
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