LESSON STUDY IN PRESERVICE ELEMENTARY MATHEMATICS METHODS COURSES: CONNECTING EMERGING PRACTICE AND UNDERSTANDING

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Introduction

Teacher education programs have long struggled to find the best way to prepare quality teachers, and research has shown that teacher educators face several challenges. Lortie (1975) uses the term 'apprenticeship of observation' in explaining how teachers' own schooling experiences shape their beliefs about teaching, and ultimately how they interact with students in their classrooms. Brouwer and Korthagen (2005) stipulate that teachers become socialized into the profession, adopting more traditional models of teaching that are consistent with the culture at most schools, despite the kind of experiences they have had in teacher education programs. We must question how much influence the teacher education program can have on teachers given that such socialization is a strong factor impacting practice.

In addition, there is a body of literature that suggests that the lack of subject matter preparation also influences teaching (Ball, 1990; Borko, 1992). Researchers recommend that teacher education program leaders reconsider how subject matter knowledge is included in courses in a manner that challenges preservice teachers' beliefs. For example, preservice teachers may engage in collaborative activities that require them to reflect on how different concepts work together in problem solving, thus they will rethink and strengthen conceptual understanding while experiencing a collaborative learning environment.

There is evidence that teacher education can and does make an impact on some teachers' practice. Darling-Hammond (2006) found links between what was taught in teacher education programs and the strategies teachers employed in their classrooms. In fact, several studies have

highlighted how methods courses that focus teachers' attention on building knowledge and a variety of pedagogical strategies result in greater ability to implement reform efforts espoused by teacher educators (Cunliffe, 1994; McDevitt, Gardner, Shaklee, Bertholf, & Troyer, 1999). Specifically in mathematics and science, there is evidence of a connection between teachers' acquisition of new teaching practices and their mathematics methods courses pedagogy (Judson & Sawada, 2001).

It is also plausible that the learning from teacher education programs sometimes takes years to appear in practice. This may be linked to preservice teachers lack of exposure to students, making it a challenge for them to understand how content and pedagogy connect to student learning. Placement in schools, with the aid of an experienced cooperating teacher, can work to address this problem in part. Still, scaffolded examinations of student thinking can also be helpful as preservice teachers make sense of their emerging practice.

Lesson study can be a cohesive professional development tool when faced with the challenge of providing high-quality learning experiences for preservice teachers. Preservice teachers are typically exposed to many new experiences in their teacher-education programs. The two main contexts for these new experiences, teacher education course work and field placements, are often considered to be at odds (thus creating a gap between beliefs and practice). When there does not appear to be direct and obvious connections between what is learned in the course work and what is experienced in field placements, preservice teachers may prioritize what they learn in the field as this learning is directly transferable to what they need to do in the new teaching context. As discussed in other chapters of this book, the process of lesson study that meaningfully connects different teaching activities (e.g., planning, assessing) can help bridge the gap for preservice teachers while keeping their focus on student learning.

Since the start of our elementary teacher education program at Stanford University in 2005[i], we incorporated lesson study to support our preservice teachers' learning of mathematics teaching. The elementary mathematics methods and lesson study process have been integrated in the courses and continually been modified and refined over the past years. Fernandez (2005) argued that lesson study could serve to focus teachers' attention on the critical work of student learning. Our preservice teachers are carefully guided through the lesson study cycle to deepen their understanding of student learning of mathematics. In the following section, we will outline the structures of our preservice mathematics methods courses with lesson study.

Lesson Study Course Activities by Week

In the initial planning of our preservice elementary mathematics methods courses, we tried to be true to the original Japanese lesson study structure (see Chapter 1) as closely as possible. We also made appropriate adjustments to meet the particular needs of the preservice teachers and the teacher-education program. We have three quarter-long mathematics methods courses in the year-long program, which are taught over three academic quarters (10 weeks each). For the entire program, the preservice teachers are placed in elementary school classrooms, while their responsibilities in the classrooms change over time. For example, their primary responsibility for the first few months will be observing and learning from being a part of the classrooms, and that will change to being responsible for teaching mini lessons with small groups of students by the middle of the year, to planning and assessing entire instructional units at the end of the year. For the first and second courses of the sequence, through activities, readings, and discussions, our preservice teachers begin to see teaching as interactive processes between teachers and students, recognize the importance of on-going informal assessment of student thinking, and understand how to teach lessons with open-ended problem solving. In

addition to this important pedagogical learning, teachers also begin to engage in investigations of elementary mathematics content. The primary activity in the third course is lesson study (the focus of this chapter), and the preservice teachers work collaboratively on lesson study for 10 weeks. Figure 1 is the lesson study calendar for the 10-week quarter.

Table 1. Lesson Study Calendar

Wk	Lesson Study Topics and Activities	Lesson Study Assignments
1	Getting overview of lesson study process	
2	Discussing cooperating-teacher interview results Deciding on lesson study goals and topics	Cooperating teacher interview results
3	Situating goals with standards	
4	Situating student learning in research and deciding on assessment tasks	
5	Analyzing preliminary student learning data	Student assessment data
6	Planning the unit and lessons	Student Assessment Summary
7		
8		
	Research Lessons (taught in Weeks 8 – 9)	
9	Reflecting as a group	Unit/Lesson Plans
10	Sharing lesson study research experiences in whole class presentations	Presentation and Lesson study portfolio
		Reflection paper

One of the goals of this course is to facilitate integration of pedagogical strategies with new and deepened knowledge for teaching (resulting in a greater knowledge base), and subsequently using the knowledge to teach mathematics in classrooms.

In the following section, we describe the course, week by week, focusing on course activities and assignments. While students engage in lesson-study activities, we also have time in class sessions for mathematics content activities and discussions. We usually allocate half of the 3-hour class meeting time each week (approximately 1 hour and 30 minutes) for lesson-study

related activities. Most assignments are group assignments, following the lesson-study collaboration format. Our preservice teachers gain valuable experience working in groups, and this group format also reduces the number of writing assignments required by each teacher.

Week 1: Introduction to Lesson Study

Our preservice teachers come to the first class session having completed assigned readings on lesson study (overview of lesson study with some practical example of how it is used in schools: e.g., Lewis and Tsuchida, 1998). As we give the overview of the course, we focus our discussion on the lesson-study process and emphasize how it will work to help connect the different parts of teaching that they have experienced so far into a meaningful whole. The preservice teachers are teamed according to their grade-level field placements, each group consisting of 3 – 5 teachers. After watching a video of a lesson-study case (*How many seats?* Mills College Lesson Study Group, 2004), we end the class by giving guidelines for the upcoming assignment. In this first assignment, the preservice teachers interview their cooperating teachers about 'challenging mathematics topics to teach, specific to their grade levels. This is a crucial assignment as preservice teachers often lack experiences to determine gaps in students' mathematical knowledge, and how to decide on the relevant mathematics topic. Thus, their cooperating teachers' knowledge plays an important role in their development. This assignment also helps maintain the connection between field-placement classrooms and university courses.

Week 2: Deciding Lesson Study Goals and Topics

The preservice teachers share their interview results in their lesson study groups. We often limit the content strand for the interview (e.g., geometry, number sense), so that we can anticipate likely topics cooperating teachers might choose. We ask cooperating teachers to

identify the top three challenging topics in the content strand, thus increasing the possibility for common topics across teachers. The preservice teachers share their interview results, negotiate, and decide on the topics for their lesson-study effort for the course. They also discuss the challenges that their cooperating teachers identified in student learning of the topics. In their groups, they discuss and make a list of what they currently know about the topic and student learning of the topic. This list is kept so that they will be able to reflect on their learning at the end of the quarter. Preservice teachers may also identify "social" goals for their students, that can range widely: e.g., 'working collaboratively in groups,' 'having each student speak at least once in class discussions.' For each lesson-study meeting, each group identifies a facilitator who focuses the group's discussion on given topics and a note-taker who keeps a written record of the discussion.

Week 3: Situating Goals with Standards

While this is not a priority in working with inservice teachers (primarily because they do this regularly), it is critical for preservice teachers to understand and become familiar with content standards. For the Week 3 meeting, teachers examine both state and NCTM standards, locate where their chosen topic fits in the standards, and identify how the standard is related to the standards in the previous and subsequent grade levels. Each lesson-study group creates a graphic organizer to illustrate the relationships among standards and grade-level expectations.

Week 4: Situating Student Learning in Research and Deciding on Assessment

Prior to this class meeting, each lesson-study group is provided with appropriate research-related readings on their chosen mathematical topic (instructors prepare the readings). In the meeting, the teachers discuss research on typical learning trajectories of the topic and possible challenges students experience in the process. They then discuss and decide, based on

the readings, assessment items to administer to their students in order to understand their current level of understanding of the topic. Please see Appendix 1 for the assessment assignment guidelines[ii].

Week 5: Analyzing Student Data

The preservice teachers bring student data from their pre-assessment interviews. After sharing what they saw/found in the data, they discuss if there are patterns in terms of student strategies and mistakes. They return to the research literature from the previous week to make sense of the patterns. Working in teams, they are likely to see similarities among students at a grade level. They create tables and charts to organize the data as a team, write a short paper discussing the patterns they see, and tie the results to the literature.

Weeks 6, 7, 8: Unit and Lesson Planning

We allocate three weeks for lesson planning. The teachers are advised that they should find time outside of class to meet and work on their lesson plans at this point. We typically provide several published lesson plans or reform-based curricular materials (e.g., Gavin, Pelkin, Spinello, & St. Marie, 2001) for the teachers and strongly encourage them to start from these existing materials as they plan lessons, and not try to create lessons from scratch. We explain that as beginning teachers, they are likely to work with a specific curriculum/textbook provided by the district/school once in classrooms, and modifying and adjusting existing materials for their own students is a skill they need to learn. By this point, each lesson study team has decided which preservice teacher is teaching the research lesson. That teacher provides necessary information about his/her students to the team (to aid in adjusting the lesson).

The teachers are provided with a lesson-plan format, which is specifically designed for research lesson events (Please see Appendix 2).

The lesson plan has sections where the teachers insert information from course assignments thus far: goals of the lesson, relationships with standards, about the students (student pre-assessment), about the lesson (how they planned the lesson), and lesson steps. The lesson steps table (Figure 3, #9) is made up of three columns: one for teacher activities, one for student activities, and the last one for evaluation points. While most other lesson plan formats focus only on what teachers do in the lesson, this format encourages the teachers to think about what students would do in relationship to what the teacher does. It also focuses their attention on particular evaluation points that will later help focus observers' attention on what to look for as they collect data on student learning during research lessons. The entire lesson plan format pulls together what they have done so far in the course (from various assignments and activities), to present their efforts into a coherent picture.

We ask the teachers to think deeply about what they have learned so far and to generate "research questions" for their lesson study. The questions should be closely tied to student learning of the topic they chose and the learning goals they specified at the beginning, but need to be re-focused and more specific. For example, a lesson study group may be planning a lesson for simple multiplication word problems for Grade 2 students. NCTM Standards, Pre-K – 2 Number and Operations, says "*understand situations that entail multiplication and division, such as equal groupings of objects and sharing equally*," and in the research lesson, the teachers may be interested in knowing what multiplication strategies Grade 2 students use to solve a division problem. Accordingly, they would specify a point in the lesson plan (on the third column) to collect data on student strategies when the key problem is presented to the students. In this way, the teachers continuously narrow their thinking on student learning of the topic and deeply consider certain student learning in the lesson, which will make data collection more meaningful.

Research Lesson Events

In consultation with the cooperating teacher whose classroom they use, we allow each lesson-study team to decide when to teach their research lesson. The research lesson event can occur any time in Week 8 or Week 9. Prior to the lesson, the preservice teacher who is teaching the lesson makes arrangements with his/her cooperating teacher to set up the room for the lesson, inform the office staff and principal about the event, and communicate with students about what will be happening. Guidelines for the research lesson event are provided for the teachers (Please see Appendix 3).

Course instructors personally invite principals, administrators, and district professional development staff to research lessons.

On the research lesson day, events unfold as summarized in the guidelines in Figure 4. While most teachers may admit how nervous they feel anticipating the lesson, most of them report that they leave the experience feeling rewarded and connected with one another in the team. Course instructors facilitate the event. Primarily for those observers who are new to lesson study, we emphasize that our focus is to learn about student learning of mathematics. We ask observers to collect data that are specified in the lesson plan materials and then discuss the data as evidence during the debriefing that follows the lesson. During the debriefing, when the discussion shifts away from student learning and other issues are discussed, we gently redirect the conversation so that we can focus once again on the student thinking observed during the lesson. In this way, we prevent the discussion from becoming a critique of pedagogy and the teacher. However, when teaching is discussed in relation to student learning during the lesson, we allow room for this type of discussion.

Week 9: Group Reflection

In the Week 9 class meeting, lesson study teams come together and reflect on the learning process they shared with one another and begin work on their final projects (See Appendix 4). The preservice teachers bring all their work samples from the course to this class, so that they have ready access to all of the materials they need to reflect. We allow the entire class period for this activity (3 hours) to allow teachers enough time for group as well as personal reflection. We provide sample portfolios from previous years, large binders, and supplies necessary to put the portfolios together.

Week 10: End-of-Quarter Presentation

As described in the finals guidelines (Figure 5), each lesson-study group presents an account of the learning process to the whole class. We celebrate the collective hard work of the course.

Discussion

We use lesson study in our courses to support the connection-building and sense-making process for our preservice teachers, to support integration of knowledge and practice, and to inform their future teaching. Lesson study is one way to value the knowledge and data we bring from the field into our course work. This is achieved by maintaining strong connections between course activities and field-based assignments (e.g., cooperating-teacher interview, pre-assessment of student learning). We stress the importance of practice in our research and theory building, as some of our preservice teachers choose to become educational researchers and teacher educators in the future. This also serves to reinforce the professionalism of the teachers, reassuring them that they are important actors and participants in the research process.

In addition to facilitating the connection-building process between their course work and field experiences, lesson study can also serve as a mechanism through which preservice teachers

connect various aspects of teaching that may seem discrete from one another. Through assignments in their teacher-education courses, preservice teachers learn a variety of critical pedagogical skills. For example, in one assignment they may conduct student interviews to learn more about the value of assessment data. In another assignment, they read about problem-based teaching, watch a video of an exemplary problem-based classroom scenario, and discuss this structure. They are likely to consider these two course experiences separately, unless their attention is meaningfully focused on the fact that assessment of student learning drives problem-based teaching, and that teachers need to understand student thinking to guide productive discussion. The lesson-study cycle connects these different teaching-related activities meaningfully as one activity builds on another.

As we delve into a next phase of the lesson study process, we continue to make references to the work that the preservice teachers have done so far in the course. We do this to make explicit connections among the different experiences. In the research lesson, it becomes obvious that all of the activities and assignments they have completed in the course are important parts of the culminating lesson. Creating a final portfolio provides teachers with an avenue to reflect on their work.

What makes this connection-building process unique in lesson study is its focus on student learning. In each part of the lesson-study process, the teachers focus on how students learn the particular lesson-study topic of their choice. For example, when they examine standards, they consider how different standards relate and connect from one grade level to the next to support student learning of the topic over time. When they conduct pre-assessment, they take ideas from literature to understand the thinking of the students in their elementary classrooms. When they plan lessons, they discuss how standards, research literature, pre-

assessment results, and curricular materials connect in terms of student learning on the topic.

Through these experiences, the preservice teachers come to understand the importance of student learning in the lesson-study process. Beginning teachers may view teaching as separate from student learning when they do not immediately see the impact of their work on student performance. They may feel lost if they believe that the lessons they teach are not effective. By understanding the connections between different aspects of their work, they are better able to look for resources in different places and shift their approach to support student learning.

The connections built between teaching, student learning, and ideas from theory/research support the development of knowledge for teachers. In lesson study, preservice teachers deepen their understanding of mathematics content through investigating student learning of the content. As they think more about how elementary students learn the mathematics topic, they reflect on their own thinking of the topic and plan research lessons. They are required to anticipate student responses to each question they pose in the lessons. This exercise challenges the teachers to revisit the content topics more deeply. Preservice teachers learn through practice how to guide student discussions, and their existing and developing knowledge supports effective facilitation of the discussion. The knowledge is meaningfully used in their classroom practice and further developed.

One aspect of lesson study which preservice teachers highly value is collaboration. Lesson study provides reasons for the teachers to collaborate meaningfully in the course, and some assignments can only be completed when all members of the group participate (e.g., student assessment). While some groups may take a longer time to develop productive working relationships, they come to appreciate each other's presence in the process. When research lessons are taught, many teachers mention how they recognize the value of having members of

the lesson-study team observe student learning in their classrooms. Lesson study allows teachers to stop and observe different learning "in the moment" with multiple eyes. For both inservice and preservice teachers, this can be a valuable experience through which they deepen their understanding of teaching and learning.

Lesson study, through its strong focus on collaborative work, works to counter both the socialization effects of schools and the "apprenticeship of observation." Teachers who favor a more traditional pedagogical approach may come together in collaboration with teachers who prefer a more reform-oriented approach, and in working together these teachers discuss their views and unite in a better approach for the students. While we support our elementary-school students to work collaboratively to learn mathematics in classrooms, it is disappointing that teachers continue to work separately and independently from one another. We hope that through the lesson study process, our preservice teachers take the desire to work with and learn from others to their future work environments. Through asking questions of their colleagues, collaboratively investigating student data, and simply sharing experiences at the end of the day, teachers will begin to have a shared responsibility for all students.

This chapter presented a description of the use of lesson study in an elementary preservice mathematics methods course, and illustrates its potential in supporting teacher learning and instructional improvement. As with other professional development formats, it is important to modify the process to meet the needs of those in a particular context. We are presenting our case to be one example, while recognizing that there may be other courses which, while different from ours, support their preservice teachers' learning just as effectively. As lesson study is a new territory in the United States and other parts of the world, sharing each group's efforts with others is valuable and we will surely benefit from continual development

and refinement of our models.

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[i] *STEP (Stanford Teacher Education Program) – Elementary* is a twelve-month program that leads to a teaching credential and a Master's of Arts degree. For more information: http://www.stanford.edu/group/step/new-step-website/elementary/index.htm

[ii] In the first and second math courses of the three-quarter sequence, the teachers have conducted informal assessment involving student interviews. Therefore, they are familiar with the assessment procedures and expectations. Preservice teachers often find it challenging to take notes from what students say and how to identify student thinking in their explanations. Reading research materials helps, but the teachers need to spend some time practicing and brainstorming possible interview settings prior to the actual face-to-face student interview experiences (e.g., watching student interview videos and discussing student strategies, role playing with peers).

Appendix 1

Student Assessment Assignment Guidelines

1. In your lesson study group, discuss key ideas for teaching and learning (Weeks 3/4)
    a. Why is this topic challenging to teach and learn?
    b. What are the typical mistakes students make?

2. Create a set of assessment items (Week 4)
    a. Start with what you discussed in the previous lesson study meeting. What are the key ideas and what is challenging?
    b. Design assessment items that highlight the difficulty and challenges of the topic (pay attention to materials used, order of questions, etc.); What does this assessment help you learn about your students' thinking? Anticipate your students' responses.
    c. Decide whether the questions will be interview questions or paper-and-pencil questions.
    d. Individual assessments should not last longer than 15 minutes (not too many questions!)

3. Assess student thinking (Week 4/5)
    a. The assessment guidelines and expectations have been communicated with your CTs.
    b. Ask your CTs to help you identify a student sample in the classroom (ideally 2 students who achieve beyond grade level, 2 right at the grade level, and 2 struggling at the level; include ELL student).
    c. If you choose to use paper-and-pencil format, find a time to talk with each individual student afterwards and ask him/her to explain thinking process.

4. Bring back assessment data to class (Week 5)
    a. You will discuss what you found in your lesson study group.
    b. What are common mistakes? Any pattern?
    c. Why such mistakes? [Connecting back to research]
    d. What do the results suggest for your teaching (regarding topic, question types, methods you might use, particular student needs)?

5. Write up assessment summary
    a. Attach all the assessment data with the summary.

Appendix 2

LESSON STUDY LESSON PLAN

In writing a lesson plan, please include the following.

1. **Title of the Lesson**
2. **Names of the teacher(s)**
3. **Grade level of the lesson**
4. **Goals/objectives of the lesson** [content objectives as well as social/affective and ELL objectives if appropriate]
5. **Relationship of the lesson to standards** [mathematics content standards for California public schools K-12, and the National Council of Teachers of Mathematics Standards]
6. **About the Lesson** [discuss how this lesson came about]
7. **Placement of the lesson in the unit** [where does this lesson fit in the unit you planned? Discuss the connections among lessons]
8. **About the students** [briefly discuss your student assessment results]
9. **Lesson steps** [Use the three-column format – please see back of the page]

Teacher support [This column explains lesson flow]	**Student activity** [This column shows anticipated student responses to the lesson activities]	**Points of evaluation** [This column focus on particular aspect of the lesson]

10. **Evaluation** [This needs to correspond to the objectives you stated at the beginning of the lesson plan]

Appendix 3

What to Expect on the Research Lesson Day …

You have worked very hard with lesson study, and the research lesson is the opportunity to celebrate your accomplishment. You chose a challenging math topic to teach, read research literature to learn why it is challenging, interviewed elementary students to find out their strategies, examined different curricular materials to see the textbook approaches to the topic, and planned your own lesson. The lesson will make your ideas and learning come to life in classroom with real "live" kids. You are the expert now, and share your pride with others who come to observe!!

***Before the lesson*:**

- Let office people know you are expecting visitors that day.
- Make multiple copies of lesson plans.
- Get all the lesson materials ready.
- Set a video camera in the back of the room and one group member can monitor the filming (if there are students whose parents do not wish them to be videotaped, move the students to the side of the room, or set the camera so that these children won't be in the picture).
- Decide who is giving the intro of the lesson (2-minute overview, see below) to the observers.
- Decide who is taking notes during the debriefing.

1. **Introduction of the lesson (start approximately 15 minutes before the lesson)**

   Observers gather in front of the classroom. Bring copies of lesson plans and give them to the observers. One member from the planning team (usually not the instructor) gives a brief overview of what will happen during the lesson and talk about the data they would like observers to collect during the lesson (it should be noted in the lesson plan). The team can also speak to their reasoning behind decisions they made about the lesson structure. The facilitator gives brief guidelines on observation protocol (handout provided). Allow a few minutes for observers to look over the lesson plan.

2. **Research lesson (up to 60 minutes)**

   Enjoy the lesson. Support the instructor as appropriate. Resist the urge to help students or otherwise interfere with the lesson.

3. **Debriefing (approximately 45 minutes)**

   Find a space for the lesson debriefing (staff room, empty classroom, bench at playground, nearby coffee shop, etc.). Decide one group member to be the scribe and keep notes of the discussion. The debriefing will follow the steps:

a. **Instructor's reflections**: The instructor describes his/her experiences in the lesson and comments on what went well and was unexpected.

b. **Planning group members' comment on the data gathered**: This may include data on student learning and engagement. Comments may be guided by two or three specific questions related to the goals of the lesson.

c. **General discussion on the data gathered**: A brief discussion period, facilitated by a moderator, focused on student learning and development, and how specific elements of the lesson promoted these.

d. **Outside commentator**: An outside expert will comment on mathematics and student learning of mathematics.

e. **Thanks**: The facilitator makes final comments and thanks everyone for the participation.

Appendix 4

Final Project Guidelines

Your finals consist with two parts: Lesson study group portfolio and group presentation.

1. Lesson study group portfolio:
   You will put together a portfolio as a lesson study group. Portfolio is not a mere collection of items but should be organized with coherent themes to guide your reflection. Your portfolio will have following categories:
   a. The work we learned the most from
   b. The work we had the most fun with
   c. The most challenging work
   d. The least favorite work
   e. (Your own category)

   For each of the category, your group will choose one item from lesson-study related work you have done this quarter. Your group may also create your own item for a category. For example, you may say "students' math talk during the lesson" as the most favorite part of your lesson study experience, and in that case, you can put some representation of the experience (photo, etc.) in the binder for the category and write a short description.
   In the big binder provided, label a divider with each category, include item(s) that you chose for the category, and write a short paragraph stating WHY you chose the particular item for the category. For the assignment you did not select, add them at the end of the binder.
   Include all the lesson-study related materials in the binder (e.g., copies of meeting notes, debriefing notes, student work from the lesson). Please also turn in your lesson CD with the portfolio.

Individual Reflection Papers (to be included in the portfolio):
   While the portfolio is assembled, reflect on the lesson study process and your learning in the quarter. Write a short individual reflection paper and include at the very end of the portfolio. The reflection paper should answer the following questions (but not limited to them):
   - What do you think you learned through the lesson study process?
   - What ideas from the lesson study experience do you think you can take to your future teaching?

2. Final lesson study group presentation:
   Prepare a group presentation to highlight your learning with the lesson study in the quarter. Each group's presentation should be approximately 20 minutes, and I encourage you to use some visuals – powerpoint, video, overhead, handouts, etc. Please include presentation materials in your final portfolio (e.g., copy of handout, copy of powerpoint slides). I can naturally see how you may use the portfolio categories to organize your presentations, but it is not required. Be creative and have fun with it☺!!