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Abstract

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Keywords

Lesson study, Reflection, Preservice teacher education

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Abstract

This study sought to determine if, how, and the extent to which, the implementation of lesson study with preservice teachers facilitates reflection in its participants. The lesson study reports of 20 preservice teachers were analyzed qualitatively along three dimensions to determine what lesson study reports revealed about their reflections. More specifically, the analysis sought to determine what preservice teachers wrote about in their lesson study reports, and if it showed signs of reflectivity. The analysis revealed that the reflections of the participants, as evidenced within lesson study reports, resided at the lowest levels, thus supporting existing literature on the reflective abilities of preservice teachers. It also highlighted the difficulty of determining the degree to which individuals engage in reflective thinking. The results point to several considerations for those who wish to implement lesson study with preservice teachers, and identify numerous questions that warrant further investigation.

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Introduction

Reflection is an essential practice in teaching. The ability to persistently and carefully consider what and how we are teaching, and to reflect on our actions as teachers to determine what works best for our students, is central to successful teaching. Reflection is also a vital component of learning how to teach. While definitions of "reflection" vary, most educators agree that thinking beyond superficial elements of one's experience to explore it in greater depth is what enables *deep* and *meaningful* learning. Furthermore, it is the process of thinking critically about experiences and actions that enables beginning teachers to connect theory and practice, and to develop more sophisticated conceptions of teaching and learning. For this reason, fostering reflection and nurturing reflective practitioners has become an important focus for many teacher education programs.

A number of approaches have been used to promote reflective abilities in preservice teachers. One practice that holds great promise for developing these skills is lesson study. Through this professional development process teachers aim to improve teaching and learning by collaboratively planning a lesson, delivering it, reflecting on its effectiveness, revising it, and then possibly repeating the process. Many of the qualities of lesson study, including its cyclical and collaborative nature, seem to make it the ideal tool for promoting reflection. However, research on the use of lesson study in preservice teacher education is still in its infancy, and there is no significant information about if, how, and the extent to which the implementation of this practice facilitates reflection in its participants. Unfortunately, even with mechanisms to encourage reflective thinking, we cannot guarantee that individuals will automatically engage in quality reflection. With the growing use of

lesson study in preservice teacher education, it is important to determine the effectiveness of this practice for this purpose. This study aimed to do just that.

Focus of the Study

At the surface, lesson study appears to be an effective method for fostering reflectivity in preservice teachers. Initial evidence suggests this, and anecdotal remarks from preservice teacher participants of lesson study, such as the following, are encouraging:

I feel that everyone who was a part of the lesson study process gained a wealth of knowledge about both the planning process, as well as their own teaching abilities. I myself feel that I have become a more reflective throughout the entire lesson planning process as opposed to reflecting after the lesson had been taught. (Preservice Teacher, lesson study report, May 2010)

This remark, taken from an individual reflection, within a group's lesson study report, captures the essence of the views of the majority of the study's 20 participants on lesson study. While comments such as this are reassuring, there is question about the quality of reflection in these experiences. For example, what did this participant mean by "more reflective"? And what was the nature of his reflection? Thus, beyond the participants' subjective appraisals of the lesson study experience, it is important to ask: What patterns of reflection are predominant for preservice teachers during the lesson study process? To answer this question, a reasonable starting point would be to determine what lesson study reports reveal about their reflections. More specifically, (a) what did preservice teachers write about in their lesson study reports? And (b) did their lesson study reports show signs of reflectivity? These questions framed the design of the inquiry.

Review of the Literature

Reflection & Reflective Practice

The belief that teachers should be reflective about their practice is not new. It is grounded in the ideas of John Dewey (1933), who defined reflection as "active, persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusion to which it tends" (p. 9), and described reflection as a specialized form of thinking that moves beyond impulsive actions, actions based on trial and error, routine actions, or those that are guided by convention or endorsed by authority – all of which prevent individuals from engaging in much thought about the reasons for and effects of their actions. Reflection prompts learners to relate new information to prior knowledge, apply specific strategies in novel tasks, think in conceptual and abstract terms, and understand their own thinking and learning strategies, thus facilitating the growth of knowledge and development of higher-order thinking skills (Hmelo & Ferrari, 1997). Furthermore, proponents of reflection (Price, 2001; Rock & Levin, 2002; Schon, 1983, 1987) maintain that a focused and critical consideration of our own behavior, which happens as a part of reflection, enables us to make intelligent and informed decisions, as well as to become independent learners – all desirable attributes for teachers.

The term "reflective practice" was coined by Donald Schon (1983), who suggested that "the capacity to reflect on action so as to engage in a process of continuous learning was one of

the defining characteristics of professional practice" (Atherton, 2011, p. 1). Reflective practice typically refers to individuals engaging in a rigorous process of reflecting on and reshaping past and current experiences with the intent of improving the quality of professional performance (Kottkamp, 1990). For teachers, the importance of this practice is multifold. On the broadest level, it enables a deeper understanding of one's own teaching style, improvement in teaching practices (Leitch & Day, 2000), and increased effectiveness as a teacher (Ferraro, 2000). At a deeper level, it assists teachers in integrating the knowledge that they gain from their experiences into their teaching repertoire, and moves them from a set of distinct skills to a stage where they are able to modify and combine strategies for specific contexts and situations and to eventually devise new strategies (Larrivee, 2000), thereby fostering the ability and confidence to react to novel and quickly-changing situations when required.

Evidence of the role of reflection in teachers' professional growth (Danielson, 2006) has made the development of reflective skills an important focus for many teacher education programs (Lee, 2005). Efforts to foster reflection in preservice teachers often involve activities such as journaling (Spalding & Wilson, 2002; Yost, Sentner & Forlenza-Bailey, 2000), portfolios (Chetcuti, 2007) and group discussions following practical experiences (Ojanen, 1993). However, encouraging reflection in learners is often difficult (Gustafson & Bennett, 1999). Gustafson and Bennett (1999) identified several variables that influence reflective behavior. These variables are grouped into three main characteristics: learner, environmental and task. In particular, a learner's skill and experience in reflective thinking, content knowledge, motivation to complete a reflective task, mental set, and sense of security felt in reporting actual reflections versus perceived desired responses, play a role in the level of reflection. Additionally, physical and interpersonal environment, as well as the nature of the reflective task, with regard to the stimulus questions, directions, or probes, the format required for reporting reflections, quality of the feedback provided following reflection, and consequences of reflecting all affect the quality of reflection. Along these lines, studies have also examined the ideal conditions for promoting reflection (Hatton and Smith, 1995; Moon, 1999). Moon (1999) identified a few essential conditions for promoting reflection: adequate time and space, a good facilitator, a supportive curricular or institutional environment, and an emotionally supportive environment. Particularly important is a flexible learning environment which prompts students to explore what they think is significant. There is also evidence that peer sharing experiences promote greater reflection (Hatton & Smith, 1995), as engaging with another person allows discussing, questioning, and confronting in a safe environment, thereby encouraging self-revelation as well seeing other points of view. Moon (1999) also identified certain characteristics of tasks that effectively foster reflection. Activities especially well-suited to promoting reflection include messy or ill-structured problems and real-life situations; questions for which there are no clear-cut answers; tasks that challenge learners to integrate new and previous learning; tasks that require the ordering of thoughts; and tasks that call for evaluation.

Lesson Study

An activity that embodies all of these characteristics is lesson study. This professional development practice, which originated in Japan, engages teachers in a process of systematically examining their teaching, with the goal of becoming more effective. The process centers on teachers working collaboratively on a "study lesson" – first planning it, then teaching it, observing it, reflecting on it, critiquing it, revising it, and optionally repeating the process. To provide focus and direction throughout the process, the teachers select an overarching goal and related research question to explore.

Lesson study has seen growing international use and has been established as a valuable model for improving teacher effectiveness (Dubin, 2010). It is considered a process for „creating deep and grounded reflection about the complex activities of teaching“ (Burroughs & Luebeck, 2010, p. 391), and the combination of collaboration and focused observation within the process possesses great potential as a powerful tool for facilitating teacher growth in content knowledge, understanding of pedagogy, and ability to observe and understand student learning (Murata & Takahashi, 2002; Perry & Lewis, 2003; Stigler & Hiebert, 1999).

In recent years, lesson study has also been used within teacher preparation programs. The qualities of lesson study make it an ideal candidate for nurturing reflectivity amongst preservice teachers. The creation and implementation of a “study lesson” provide the opportunity for messy and challenging real-life teaching experiences that encourage teacher candidates to connect theory and practice, and to integrate new and previous learning, both essential components of the reflective process. A major strength of lesson study lies in the fact that, through the lesson study process, colleagues work together to determine what is important for students to understand about the content, and to figure out how to best teach this content. In developing the lessons, members of the group consider the details of the lesson, even down to the exact phrasing of questions and teacher explanations, and also work to anticipate student questions, responses and misconceptions. Through this process, teachers think critically about teaching and learning, discover gaps in their own knowledge, and acquire the needed information, either through each other or through content specialists (Lewis, 2002). It also provides a less-structured learning environment, which prompts students to explore what they think is important, and includes a collaborative component, which allows participants to see other points of view. Additionally, the cyclical nature of lesson study allows participants to reflect on their strengths, weaknesses, and areas for development, and reshape past experiences with the intent of improving practice.

Within the realm of preservice teacher preparation, research on lesson study is still relatively limited. However, the process shows great potential as a mechanism for bridging theory and practice, a means of initiating future teachers into the practice of collaborative planning, teaching, observation and reflection, a way to give teacher candidates the opportunity to learn from one another, and a framework for them to think deeply about content and student learning (Dubin, 2010). Similar to the studies on lesson study with inservice teachers, initial literature on lesson study with preservice teachers has suggested the process provides opportunities for preservice teachers to build learning communities, increase their understanding of content and pedagogy, and to develop the practices of critical observation, analysis, and reflection (Burroughs & Luebeck, 2010; Chassels & Melville, 2009). While these claims are encouraging, there is no substantial evidence regarding the development of reflectivity. Furthermore, the literature reveals diverse interpretations of lesson study, and wide variation in its implementation with preservice teachers. There is also concern that conditions for preservice teacher lesson study are often unique, and participants typically have less experience, fewer skills in reflective thinking, and weaker content knowledge – all qualities which have been identified as influencing reflective behavior (Dubin, 2010). These things undoubtedly impact the effectiveness of lesson study for fostering reflectivity. Given the importance of quality implementation of the practice, with the ultimate goal of improving teaching and learning, this investigation aimed to shed light on the potential of lesson study for facilitating reflectivity in preservice teachers, with the purpose of adding to the current knowledge base on this topic, and informing future practice, in this regard.

Context

The subjects of the study were 20 undergraduate students enrolled in a mathematics methods course at a small four-year university in Hawaii. The course is the second of two required mathematics methods courses required of all students in the elementary teacher education program, and includes a 35-hour practicum. A primary focus of the course is the implementation of a lesson study. The aim of the assignment is to give teacher candidates an opportunity to experience the process of lesson study, so as to engage in systematically examining their practice, with the ultimate goal of helping them to become more reflective and effective teachers.

For the lesson study, teacher candidates were placed in groups ranging in size from three to five members, and required to complete one lesson study sequence, which included collaboratively creating a study lesson, implementing and observing the lesson, debriefing the lesson, and revising it. As is custom in lesson study, groups were instructed to select an overarching goal for their students and a related research question, in order to provide focus and direction for their work. Examples of such an overarching goal, research question, and the relationship between the two are as follows:

1. Overarching Goal: Students will become independent problem solvers.
2. Research Focus: How can manipulatives be used to promote student understanding of mathematical concepts and/or procedures?
3. Relating Research Focus & Overarching Goal: How can manipulatives be used to increase the abilities of students to be independent problem solvers?

At the beginning of the process, the participants received an in-depth introduction to the practice of lesson study and were then guided through the process of selecting an overarching goal and related research question. After collaboratively planning the lesson, each group chose one group member to teach the lesson within his or her practicum classroom, while the remaining group members served strictly as observers of the lesson. After the lesson was taught, the groups reconvened to share their observations, to reflect, to discuss strengths and weaknesses of the lesson, and to revise the lesson accordingly. Groups were given the option to implement the study lesson for a second time, after revision, either in the same class or within a different class. If a second implementation occurred, the group was instructed to meet again to debrief and revise the lesson plan for a second time.

For the purpose of record keeping and reflection, participants were encouraged to keep a written account of the process as well as their thoughts and feelings throughout. At the conclusion of the lesson study process, groups were required to write a lesson study report. The report format was an adaptation of the format developed by the Lesson Study Research Group (2001), and required groups to document the process, and to discuss the motivations, goals, achievements, and challenges at each stage. In addition, reports included a group reflection as well as individual reflections. For each of these sections participants were instructed to address resulting changes in thinking, general techniques or principles that were learned from the process, as well as specific ideas that they would take to their future classrooms. Additionally, for the individual reflection, participants were instructed to provide detailed reflection on what they learned as individuals while working on this process, in the areas of content knowledge, teaching and learning. In essence, the purpose of the lesson study report was to document the discussions and reflections that took place throughout the entire lesson study process, to help clarify the intents, rationales,

and issues that the groups encountered as they engaged in the process, and to describe the lessons learned as a result.

Finally, each group was advised by the course instructor throughout the process. As “advisor,” the instructor was invited by group members to occasionally provide subject matter expertise, new ideas and different perspectives. The instructor also attended all study lessons and participated in all post-lesson debriefings.

Method

Data for this qualitative study consisted of lesson study reports from the 20 teacher candidates who participated in lesson study. As described previously, each lesson study report included two parts: a group report and reflection and an individual reflection; thus, the data consisted of six group reports and reflections, and 20 individual reflections. Both parts were analyzed separately. Since lesson study reports could potentially include multiple themes and multiple levels of reflection, as a first step, the data was analyzed for segments, or “chunks” of writing on a particular theme or topic, following procedures developed by Ward and McCotter (2004) in a study that looked at reflective levels within the writing of teacher candidates. Segments were identified by changes in the focus of the report without a clear transition or connection to the previous focus. In all, group reports yielded 310 segments and individual reports yielded 238 segments. These segments were then examined qualitatively and coded for language function, recurrent themes and for levels of reflective writing. All analysis and coding was completed by the author. For purposes of establishing reliability, a section of 100 segments was coded by an additional coder, and inter-rater reliability was established at 92%.

Identifying Language Function and Recurrent Themes

Since it was not only important to find out what teacher candidates wrote about, but also how they wrote about it (for example, reporting, evaluating, explaining, etc.), as a first step, segments were analyzed to identify the language function, or, in other words, the purpose for the writing, using a framework by Lee (2008), who analyzed the language function within response journals of preservice teachers. Lee’s five themes were as follows: (a) describing and recalling; (b) interpreting, analyzing and inquiring; (c) evaluating; (d) extrapolating/expressing personal voice; and (e) interacting with instructor. After an initial reading of the lesson study reports, it became evident that, while most of these themes were relevant to this study, lesson study reports included no incidents of interacting with the instructor; therefore, all segments were categorized according to the four following themes: (a) describing (giving an account of) and recalling (remembering and recollecting); (b) interpreting (explaining the meaning of), analyzing (breaking complex things into parts to better understand them) and inquiring (seeking information by asking a question); (c) evaluating (determine something’s merit, worth or significance); and (d) extrapolating/expressing personal voice (extrapolating experiences, commenting on cognitive changes, personalizing and sharing insights, expressing feelings, thoughts and concerns, asserting beliefs and making resolutions).

Segments were then analyzed qualitatively using a method of inductive analysis (Patton, 2002), to search for recurrent themes of focus within lesson study reports. Patterns were identified, coded, counted, and classified into broader thematic categories. Analysis revealed, within each of the categories of language function, the following four focuses: (a) lesson study process, (b) teaching, (c) learning, and (d) academic content (in this case, mathematics). Therefore, each of the four language-function categories was further divided according to focus, and resulted in the sixteen categories found in Table 1. Finally, each of the 548 segments was assigned to one of these sixteen categories.

Table 1. Categorization Scheme for Lesson Study Report Segments According to Language Function and Focus

Language Function	Focus			
	Lesson Study Process	Teaching	Learning	Academic Content
Description or Recall	description or recall of lesson study processes	description or recall of teaching	description or recall of learning	description or recall of academic content
Interpretation, Analysis or Inquiry	interpretation of, analysis of, or inquiry about the lesson study process	interpretation of, analysis of, or inquiry about teaching	interpretation of, analysis of, or inquiry about learning	interpretation of, analysis of, or inquiry about academic content
Evaluation	evaluation of the lesson study process	evaluation of teaching	evaluation of learning	evaluation of academic content
Extrapolation or Expression of Personal Voice	extrapolation or expression of personal voice about the lesson study process	extrapolation or expression of personal voice about teaching	extrapolation or expression of personal voice about learning	extrapolation or expression of personal voice about academic content

Determining Levels of Reflection

As with all skills deemed important, the emphasis on reflection and reflective practice has brought with it an effort to define and categorize related skills, and a search for ways to determine if and to what degree they are taking place. There are multiple frameworks for looking at levels of reflection (Donovan, Bransford & Pellegrino, 1999, Hatton & Smith, 1995; Lee, 2008; Marchel, 2004, Moon, 2002), and while all differ in specifics, all agree that reflection is a mental process, which goes beyond simple recollection, and challenges individuals to use critical thinking to examine presented information, question its validity, and draw conclusions based on the resulting ideas. For this study, the process of determining levels of reflection drew on Hatton and Smith's (1995) four levels of reflective writing:

1. Descriptive writing
2. Descriptive reflection
3. Dialogic reflection
4. Critical reflection

Hatton and Smith's framework was chosen as the analytical tool for this study as it is well established and accepted as a model for evaluating the reflective levels of preservice teachers, particularly as demonstrated through writing. Hatton and Smith described the lowest level, *descriptive writing*, as "not reflective at all." Descriptive writing reports or describes events, actions or situations, without making any attempt to provide justification. *Descriptive reflection* can be explained as going a step beyond mere recall, by making some attempt to provide justification for events, actions or situations, but in a very basic and descriptive way. Reasons are typically based upon personal judgment. This level of reflection may be used in solving specific problems, but does not question the nature of the problem itself. In other words, it addresses the question, "how?" but does not ask the question, "why?" At the next level, *dialogic reflection* demonstrates a more sophisticated

way of thinking about events, actions and situations. The term itself suggests discussion or a consideration of the views of others, and in this type of reflection, the individual typically explores alternative explanations from different perspectives. At the highest level is *critical reflection*. This level of reflection is evidenced by the individual giving reasons for events, decisions, or actions, which take into account broader historical, social, cultural and/or political contexts (Hatton & Smith, 1995).

As a final step, all of the 548 lesson study report segments were read and coded according to the reflective level exhibited within them. Results were tabulated to expose the overall patterns of language function, theme and reflection within group and individual lesson study reports, which are documented in Tables 2 and 3.

Table 2. Group Lesson Study Report and Reflection Segments Coded According to Language Function/Focus and Level of Reflection

Language Function & Focus	Total	Level of Reflection			
		Descriptive Writing	Descriptive Reflection	Dialogic Reflection	Critical Reflection
Description or Recall of Lesson Study Process	99 31.9%	89 28.7%	10 3.2%	0 0.0%	0 0.0%
Description or Recall of Teaching	66 21.3%	50 16.1%	16 5.1%	0 0.0%	0 0.0%
Description or Recall of Learning	11 3.5%	11 3.5%	0 0.0%	0 0.0%	0 0.0%
Description or Recall of Academic Content	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Interpretation, Analysis or Inquiry About the Lesson Study Process	1 0.3%	1 0.3%	0 0.0%	0 0.0%	0 0.0%
Interpretation, Analysis or Inquiry About Teaching	17 5.5%	1 0.3%	13 4.2%	3 1.0%	0 0.0%
Interpretation, Analysis or Inquiry About Learning	15 4.8%	0 0.0%	13 4.2%	2 0.6%	0 0.0%
Interpretation, Analysis or Inquiry About Academic Content	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Evaluation of Lesson Study Process	1 0.3%	0 0.0%	1 0.3%	0 0.0%	0 0.0%
Evaluation of Teaching	26 8.4%	10 3.2%	16 5.2%	0 0.0%	0 0.0%
Evaluation of Learning	3 1.0%	0 0.0%	3 1.0%	0 0.0%	0 0.0%
Evaluation of Academic Content	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Extrapolation or Expression of Personal Voice About the Lesson Study Process	41 13.2%	21 6.8%	19 6.1%	1 0.3%	0 0.0%
Extrapolation or Expression of Personal Voice About Teaching	24 7.7%	7 2.3%	15 4.8%	2 0.6%	0 0.0%
Extrapolation or Expression of Personal Voice About Learning	6 1.9%	4 1.3%	2 0.6%	0 0.0%	0 0.0%
Extrapolation or Expression of Personal Voice About Academic Content	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Total		194	108	8	0

62.6%	34.8%	2.6%	0.0%
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Table 3. Individual Lesson Study Reflection Segments Coded According to Language Function/Focus and Level of Reflection

Language Function & Focus	Total	Level of Reflection			
		Descriptive Writing	Descriptive Reflection	Dialogic Reflection	Critical Reflection
Description or Recall of Lesson Study Process	17 7.1%	16 6.7%	1 0.4%	0 0.0%	0 0.0%
Description or Recall of Teaching	13 5.5%	13 5.5%	0 0.0%	0 0.0%	0 0.0%
Description or Recall of Learning	3 1.3%	3 1.3%	0 0.0%	0 0.0%	0 0.0%
Description or Recall of Academic Content	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Interpretation, Analysis or Inquiry About the Lesson Study Process	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Interpretation, Analysis or Inquiry About Teaching	4 1.7%	0 0.0%	4 1.7%	0 0.0%	0 0.0%
Interpretation, Analysis or Inquiry About Learning	14 5.9%	4 1.7%	7 3.0%	3 1.3%	0 0.0%
Interpretation, Analysis or Inquiry About Academic Content	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Evaluation of Lesson Study Process	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Evaluation of Teaching	24 10.1%	9 3.8%	13 5.5%	2 0.8%	0 0.0%
Evaluation of Learning	3 1.3%	1 0.4%	2 0.8%	0 0.0%	0 0.0%
Evaluation of Academic Content	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Extrapolation or Expression of Personal Voice About the Lesson Study Process	24 10.1%	8 3.4%	16 6.7%	0 0.0%	0 0.0%
Extrapolation or Expression of Personal Voice About Teaching	100 42.0%	28 11.8%	70 29.4%	2 0.8%	0 0.0%
Extrapolation or Expression of Personal Voice About Learning	30 12.6%	10 4.2%	19 8.0%	1 0.4%	0 0.0%
Extrapolation or Expression of Personal Voice About Academic Content	6 2.5%	4 1.7%	2 0.8%	0 0.0%	0 0.0%
Total		96 40.3%	134 56.3%	8 3.4%	0 0.0%

Findings

Analysis revealed that lesson study reports included a variety of language functions and focuses, but demonstrated reflection mostly at the lowest levels. More specifically, the following themes emerged.

Group Focus on Lesson Study Process and Individual Focus on Teaching

Analysis of group reports revealed writing about every theme except for academic content, with the majority of writing serving to describe or recall (57%) and a primary focus on the lesson study process (46%). Within group reports, segments categorized as description or recall of the lesson study process comprised the largest percentage of segments (32%). The following excerpt from a group lesson study report exemplifies these segments:

While designing the study lesson, we have had many discussions, concerns, challenges, and issues while engaging in the lesson study process. It took our group about a month to plan and implement the study lesson with numerous meetings.

In contrast, analysis of individual lesson study reports revealed writing within in each of the language function and theme categories, with the exception of interpretation of, analysis of, inquiry about the lesson study process and evaluation of the lesson study process. The bulk of the individual report segments fell within the language function category of extrapolation or expression of personal voice (67%), and the primary focus of all segments was on teaching (59%). Segments categorized as extrapolation or expression of personal voice regarding teaching comprised the largest percentage of segments (42%). Throughout these segments, teacher candidates extrapolated experiences to future practice, commented on cognitive changes, personalized and shared insights, expressed feelings, thoughts and concerns, asserted beliefs and made resolutions about teaching. An example of such a segment is as follows:

Another technique I learned to use in this study lesson was how to facilitate an effective discussion using probing questions to make students analyze and think deeply about how they are solving the math problems. When I asked probing questions such as, "How do you know 0.33 is the decimal form of 33%?" it forced students to explain their answers.

Focus on Teaching over Learning

While results demonstrated significant attention to teaching and learning as a whole (80% for individual reports and 54% for group reports), it is worth noting that there was a greater focus on teaching than on learning in both individual reports (59% vs. 21%) and group reports (43% vs. 11%). These results indicate a considerably greater focus on teaching than on learning, and are disappointing given the purported benefit of lesson study for focusing attention on the student.

Predominance of Descriptive Writing and Reflection and Absence of Critical Reflection

The level of reflection that characterized both group and individual lesson study reports was predominantly non-descriptive or descriptive in nature. As teacher candidates described their accounts of the lesson study process, of teaching and of learning, they exhibited few reflective accounts at the dialogical levels and no accounts at the critical level. The principal category of reflection identified within the individual reports was „descriptive reflection,“ (55.9%). The following excerpts from two separate individual lesson study reports illustrate this level of reflection – that which is based on a single perspective, factor or rationale:

After implementing more wait time, asking more probing questions and allowing more opportunities for students to share their work on the board, teaching through discussion got a lot better, and students were able to talk more. However, the terminology was still confusing and the lesson was still a lot for some of the students to take because it wasn't developmentally

appropriate. Because it was too much, behavior problems started to arise, even for the students that did get it. Because it was also too easy for those that understood and got it, behavior problems also arose with them.

I feel that I was really successful in engaging the students in the lesson. The students seemed mostly engaged because the activity was something different for them. They usually do majority of their mathematics out of their textbooks, so for them to get the opportunity to work hands on with cooking, they were excited to do something different. I knew I was successful when posing the questions I had for the students because they showed me that they understood what I was asking them and were able to answer the questions correctly.

Within group reports, the majority of segments were categorized as „descriptive writing,“ (62.6%), or non-reflective in nature. While these findings are in alignment with the nature of the lesson study report requirements, which instructed participants to “re-trace” their steps throughout the process, and to “address resulting changes in thinking, general techniques or principles that were learned from the process, as well as specific ideas that they would take to their future classrooms,” it falls short of requirements to provide “detailed reflection on what they learned as individuals while working on this process, in the areas of content knowledge, teaching and learning.” Across the board, students failed to move beyond the lowest level of reflection, except on rare occasion (3.4% for individual reflections and 2.6% for group reports), and overall, demonstrated what Ward (2004) labeled “either a lack of curiosity or a lack of attention to complexity.” The next most common level of reflection was descriptive reflection (34.8%), and out of a total of 548 segments there were only 15 incidents of dialogical reflection and no incidents of critical reflection.

Within this context, also noteworthy is the relatively small number of segments categorized as „interpreting, analyzing and inquiring“ across all reports (8% individual, 11% group). This finding indicates that teacher candidates generally failed to explain the meaning of events, actions and situations, to break them into parts to better understand them, or to seek information about them by asking questions, and thus failed to explore alternative explanations, to consider the different perspectives, to take into account broader contexts, and to demonstrate the level of sophistication necessary to reach higher levels of reflection.

Discussion

The findings of the analysis are consistent with previous studies on reflective practice of preservice teachers (Orland-Barak, 2005), which found that preservice teachers’ reflections tend to reside at the lowest levels, but incompatible with literature that supports lesson study for improving reflectivity. This, along with the other findings of the analysis, raises several questions regarding the use of lesson study with preservice teachers.

Does Lesson Study Foster Reflectivity in Preservice Teachers?

The predominance of descriptive writing and descriptive reflective language over dialogical and critical reflective language reinstates the question of the quality of reflection associated with preservice lesson study. Given the findings, it is necessary to ask: Is the practice of lesson study, in fact, an effective means of fostering reflectivity with preservice teachers? And, if so, how might lesson study be implemented as to raise them to the more desirable levels of reflection?

Given previous literature and widespread positive reviews on the practice of lesson study, it is unreasonable to dispute its worth. However, perhaps there is something unique about the population of this study, or the preservice teacher population as a whole, that prevents them from benefiting from the lesson study process to the extent that more experienced teachers do. Although this study does not make clear what factors account for the low levels of reflection and the absence of critical reflection, previous studies (Galvez-Martin, M. & Bowman, C., 1998; Orland-Barak, 2005) support the idea that novice teachers typically lack the sophistication necessary to reach the highest levels of reflection. Additionally, referring to the literature that indicates that a learner's skill and experience in reflective thinking, content knowledge, motivation to complete a reflective task, mental set, and sense of security felt in reporting actual reflections versus perceived desired responses, play a role in the level of reflection, there is likely one or more of these factors that explain why lesson study, while seemingly conducive to reflection, fails to foster higher levels in preservice teachers. Thus, given the population, it may be necessary to modify the process or the support mechanisms.

On the other hand, the literature on reflection is a reminder that reflection cannot not be reduced to a checklist of behaviors as it is a "complex, rigorous, intellectual, and emotional enterprise that takes time to do well" (Rodgers, 2002, p. 844). In light of this perspective, perhaps it is reasonable to conclude that it is not so much a reflection on the process of lesson study, but on the lengthy and complex nature of creating reflective practitioners.

Furthermore, we must consider that, while it can be argued that reflective writing provides the evidence of reflective thinking, absence of reflective writing does not necessarily mean absence of reflective thought. Because reflection often takes the form of an internal conversation, determining the degree to which students engage in reflective thinking is a considerably difficult undertaking (Kember, 2000). As such, it is necessary to question the lesson study report as an accurate representation of the reflection that occurs throughout the long and complex lesson study process.

Does the Lesson Study Report Provide an Accurate Account of Reflection?

As a start, it is important to consider the purpose for the lesson study report. As with many components of the lesson study process, there seems to be wide variation in the interpretation of, rationale behind, and implementation of the lesson study report. The term "report" suggests a step-by-step account of the proceedings of a group. If interpreted at the most basic level, it is unlikely to include a true indication of the level of reflection that took place within and as a result of the process. However, if it is intended as a reflective account, and interpreted as such, then its contents should reveal such reflections. In this instance, the purpose was given as follows: "...to document, for yourself and others, the discussions and *reflections* that took place throughout the entire lesson study process". For this reason, reports presumably should have included evidence of the reflections that occurred. It can be assumed, then, that either (a) the reports gave an accurate account of reflections, in which case, the quality of reflection associated with preservice lesson study must be considered; or (b) that lesson study reports did not provide accurate evidence of the reflections that occurred, in which case, we must consider why? Having considered the first assumption, above, it is necessary only to consider the alternate explanation: that lesson study reports did not provide accurate evidence of the reflections. It is certainly possible that teacher candidates did reflect at higher levels, but only failed to elaborate upon these reflections, perhaps because of how they interpreted the lesson study report (as a step-by-step account of the proceedings of a group, rather than a reflective account), or because of their inability to recognize or articulate their own reflective processes?

Another possibility is a shortcoming in the framework for analyzing reflective writing, in the case of lesson study reports. Lesson study reports are unique in that descriptions or recollections, which are typically non-reflective in nature (Lee, 2008), and are thus coded as such with Hatton and Smith's (1995) framework, often include reports of higher level reflective activity within them. For example:

For the next hour, we decided on our research focus and content specific goal. We then combined those with our overarching goal together to make a coherent focus... During this initial meeting, we decided that using manipulatives would be the best aid in nurturing a confident math learner. We really tried to concentrate on our research focus and what it means; also, how our lesson tied to that research focus. This made all of us think critically about what it meant to nurture a confident math learner.

Although segments such as this suggest and even declare additional higher-level reflection, above its mention there is no evidence of the quality of that reflection. Consequently, they cannot be evaluated and categorized as such. While another framework might allow a more accurate assessment of reflection, it is unlikely. It is questionable what preservice teachers understand about reflective thinking, and, in this case, consider as thinking "critically." Nevertheless, we must recognize the fact that additional reflection, at some level, has almost certainly taking place, for which the framework and thus the study do not account.

What is the Focus of Lesson Study?

Finally, it is important to address the findings regarding dominant themes within group and individual reports. The evidence that suggests a primary group focus on the lesson study process is not surprising given the reporting requirements of documenting and retracing the steps throughout the process. However, unexpected are the findings that indicate a primary individual focus on teaching, and a greater focus on teaching than on learning across group and individual reports. The finding is consistent with previous studies that show preservice teachers typically focus on teacher behavior rather than student learning (Madsen & Cassidy, 2005), but incompatible with a primary aim of lesson study – focusing on student thinking (Lewis, 2002). What does this reveal about preservice lesson study and its effectiveness for its intended purposes? Do lesson study reports expose a possible weakness in the lesson study process? If so, is this phenomenon unique to the participants of this study or to preservice teachers as a whole? Alternately, it could be indication of a limitation in the reporting mechanism. Ultimately, participants have various reasons for choosing what they write about, and thus their writing is not always a true indication or a full picture of the thoughts that occur within their heads.

Limitations of the study

In addition to questions about the lesson study report as an accurate account of reflection, and possible shortcomings in the analytical framework, there is another issue that must be considered with regard to the generalizability of this study. The study sample was one of convenience. This sampling technique, while useful in documenting the particular quality of a phenomenon within a given sample, and for detecting relationships among different phenomena, is not representative of the entire population. As such, the results from this study may differ from the results of a similar study with other preservice teachers or inservice teachers. These limitations should be taken into account when considering the implications of this study.

Implications for Teacher Education

The results of this study support existing literature on the reflective abilities of preservice teachers, and underscore the difficulty of determining the degree to which they engage in reflective thinking. They suggest that lesson study, by itself, may not be an effective way to promote reflectivity at the highest levels amongst this population, and point to several considerations for those who wish to implement lesson study with preservice teachers. It is important to consider, however, that the lesson study report may not provide a complete representation of preservice teachers' reflections. Thus, the study also identifies numerous questions that warrant further investigation.

Future Research

In many ways, the results of this study raise more questions than they answer. Questions about the lesson study report as evidence of reflective thinking, and about possible shortcomings in the framework for use with lesson study reports, give good reason for further investigation. It may be necessary to develop a new framework for analyzing the reflective levels of lesson study reports. On the other hand, even with well-established instruments, gauging the extent of reflective thinking in writing is considerably difficult. For this reason, it is advisable to explore supplementary ways of measuring the level of reflection that occurs during the lesson study process, perhaps by gaining access, throughout the process, to the reflections that occur within groups and individuals.

Additionally, given the results, and existing literature, which reveals diverse interpretations of lesson study and wide variations in its implementation with preservice teachers, it is prudent to investigate how lesson study can best be utilized with preservice teachers to promote higher levels of reflectivity. What conditions are best for encouraging reflection? What process-related exercises will best facilitate reflective thinking? And what support mechanisms will best advance preservice teachers' reflective skills? As well, if the task of completing the lesson study report is intended as a means to facilitate reflective behavior amongst participants, future studies should focus on ways to promote greater reflection throughout this process.

Finally, the issues presented as limitations of the study point to the need for further research, which incorporates various and extended populations.

Future practice

This study also calls attention to important considerations and measures for those wishing to use lesson study with preservice teachers. Previous studies (Russell, 2010; Ward & McCotter, 2004) have shared concerns that students are often asked to reflect on experiences without ever discussing the qualities of good reflection. Since students do not automatically know what is meant by reflection, results are often disappointing. Given that preservice teachers are expected to reflect during the lesson study process, we must consider how they are prepared to do so. Are they taught what it means to reflect? And beyond recalling experiences, and perhaps thinking about them in depth, are they being prepared to ask questions, to analyze and interpret experiences from multiple perspectives, and to think critically about issues and problems? Teaching individuals what it means to reflect, and how to reflect is clearly a requisite step in getting them to reflect throughout other experiences. Thus, it is recommended that these things are incorporated into preservice teacher education *well before* the implementation of the lesson study process.

Along these lines, literature reveals a variety of interpretations of the word “reflection,” and although the term is used quite readily in education circles, a common understanding of this notion is likely rare. Teacher educators who aim to improve reflectivity, and who implement processes aimed at doing so, should be clear about what is desired of participants, in this regard, in order to best inform implementation of such processes. Is it enough for participants to think about practice with the intent of improving? Or is it desirable to have participants who take into account broader historical, social, cultural and/or political contexts, as suggested in the highest level of reflection in the framework used for this study? The answers to these questions are particularly important for shaping the experiences, tasks and questions, and support mechanisms that will best facilitate the development of preservice teachers’ reflectivity prior to lesson study.

While this investigation did not reveal evidence about specific ways to use lesson study in order to best facilitate reflection, it seems clear that the process alone does not guarantee reflection in preservice teachers, and that additional support is necessary to ensure that it happens. In planning this support, we should be reminded that physical and interpersonal environment, as well as the nature of the reflective task, with regard to the stimulus questions, directions, or probes, the format required for reporting reflections, the quality of the feedback provided following reflection, and the consequences of reflecting all affect the quality of reflection.

Educators interested in using lesson study to encourage reflection in preservice teachers would be wise to integrate recommendations from existing literature on characteristics of environments and tasks that prompt and support reflective thinking. Specifically, the following measures are suggested:

Create an environment that is conducive to reflection. Provide adequate time, support collaborative inquiry, and encourage reflective thinking rather than prescriptive thinking.

Emphasize the reflective nature of the lesson study process. At each step throughout the process, ask questions that seek reasons and evidence; solicit reviews of the learning situation, of what is known, what is not yet known, and what has been learned; and encourage participants to consider alternative perspectives and reevaluate conclusions.

Include tasks that require continuous reflection. Assign small tasks along the way, which require reflection. Provide a reflective journal, in which participants write down their positions, provide rationale for their thoughts, and explore different perspectives, opposing positions, and weaknesses of their own ideas. This will help them become more aware of their thoughts, as well as see things from multiple perspectives and in wider contexts (Morrison, 1996).

Provide quality support. The most important aspect appears to be the attention from a mentor or a professional who ensures that “the reflection goes somewhere” (Atherton, 2011, p. 1). Model reflection, provide select explanations to guide participants’ thought processes during explorations, and offer quality evaluative feedback to reflection, in the way of additional questions and suggestions of alternative possibilities, in order to encourage continued thought and deeper reflection about the topic.

In conclusion, this study reinforces the complexity of reflection, the difficulty of assessing it and the challenge of fostering it. It is clear that gaining access to reflective thoughts is a difficult process. However, doing so is an integral step to improving learning and teaching, and thus work in this area should continue. For now, it appears that providing opportunity for reflection, through processes such as lesson study, may not be enough. If the ability to reflect is desired of future teachers, it is essential that we teach them this skill, provide the necessary support to facilitate it, and persist with the search for the most effective ways of doing so.

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